The Excavating Engineer

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ADDRESS ALL COMMUNICATIONS TO

THE EXCAVATING ENGINEER PUBLISHING COMPANY

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Progress of work on the Kansas City Terminal. Top view: excavation operations Jan. 1911. Middle view: same, taken Sept. 1911. Bottom view: station near completion, Feb. 1913. These three views were taken from the same spot.

Shovel Work on the Kansas City Terminal

FOR many years the Union Station at Kansas City, Missouri, has been recognized as the most congested in the country. Indeed within the last few years the situation has become almost intolerable.

About seven years ago the railroads interested appointed a board of engineers to study the situation and report on the best methods of alleviating the difficulties. The chairman of this board was Mr. J. B. Berry, at the time chief engineer of the Union Pacific Railroad. This, in July 1906, led to the organization of the Kansas City Terminal Railway. This company was to build a station on a new site and to construct such tracks and connections as would allow all the roads entering Kansas City to run their passenger trains into the new Terminal.

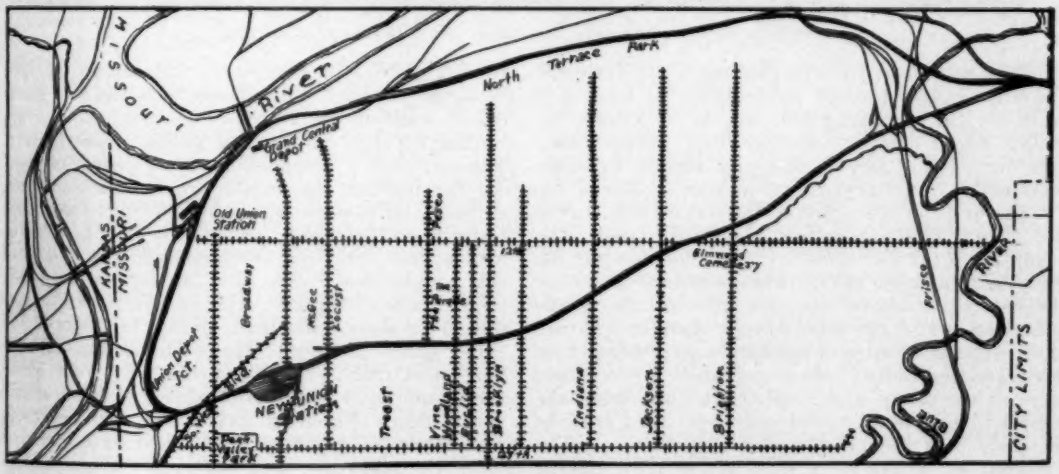
In 1910 the new company acquired the old Kansas City Belt Railway, which made it possible to start construction work at once. This was accomplished April 28th, 1910.

As may be seen from the map, the plan was to build a new line around the north end of the city in order to divert the through freight from the main passenger lines. The Old Belt Line by this plan now becomes the main passenger line to the Terminal. The grade on this line was so heavy that pusher engines have been employed to aid the heavy trains. It has been necessary to reduce this grade and to widen the right of way. This has called for a very large amount of heavy excavation.

In order to appreciate the complexity of the problem, it must be known that fifteen different railroads had to be taken care of. Every one of these had to have its connection with the main line. The following roads were involved; The Atchison, Topeka and Santa Fe Railroad, The Missouri Kansas and Texas Railway, The St. Louis and San Francisco Railroad, The Union Pacific R. R., The Chicago, Rock Island and Pacific Railway, The Missouri Pacific Ry., The Chicago Great Western Railway, The Chicago Burlington and Quincy Railroad, The Wabash Railroad, The Quincy, Omaha and Kansas City Railroad, The Chicago, Milwaukee and St. Paul Railway, The St. Joseph and Grand Island Railway, The Kansas City Southern Railway and the Chicago and Alton R. R.

In addition to this the industrial connections of the Belt Line had all to be considered. On the main passenger line from Southwest boulevard to the station there will be eight main tracks; two nominally for industrial freight, four for passenger and two for empty equipment to and from the coach yards. From the station to the Paseo there will be six main tracks; four for passenger business and two for industrial freight. From Eighteenth street to Sheffield there will be five main tracks, two for passenger business, two for industrial freight and one for switching.

On the portion of the line where the grade is reduced there are frequent connections between the main tracks on the lower level and the industrial tracks on the present surface. All passenger track connections are double track. A number of interlocking plants will be constructed to take care of



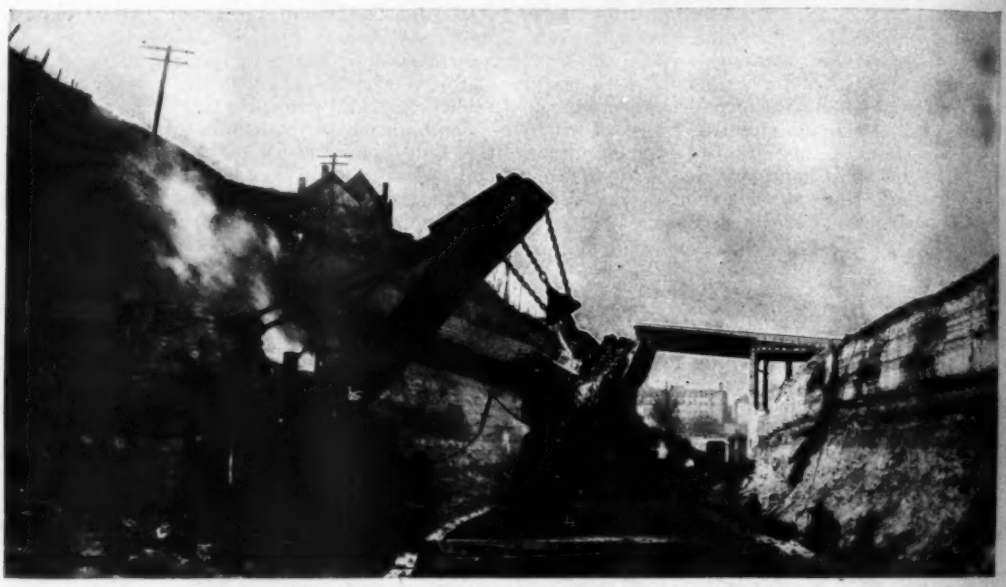
Approaches to New Union Station, Kansas City.

junction points and crossings, the tracks between being protected by automatic signals. The accompanying map indicates the general arrangement.

The excavation, except for 70,000 cubic yards for the freight depot on the freight line north of the city, may be divided into two divisions; the station site excavation and the grade reduction. The former amounts to 675,000 cubic yards. At the present time this is all completed except for a batch of 40,000 cubic yards in one corner, which is being cleaned up now. The total excavation to date on the station site is 616,674 cubic yards.

completed. It raised the level of the ground whereon this yard was built an average of about ten feet putting it above the reach of high water. When this yard was being made there was plenty of room for the operation of unloading plows. Two Lidgerwood unloaders were used and five Bucyrus unloading plows; these were two left-hand side plows, two right-hand side plows and one center plow. The center plow was used on the earth and the rest for the most part, on the rock.

The Marion and Bucyrus shovels averaged 1274 and 1444 cubic yards respectively per day of ten hours.



Bucyrus 70-C on the Grade Reduction. Note Character of Digging.

This was done by The Kansas City Terminal Railway except 150,000 cubic yards of basement work for the station, which was let to George A. Fuller Construction Company, the general contractors. Fuller sub-let this to Callahan Brothers who used a 70-C Bucyrus and a Marion Model 60.

The first shovel started on the station site August 26, 1910. The excavation was finished with the exception of the 40,000 cubic yards before mentioned, early in September 1911. The conditions here were far better for shovel outputs than on the grade reduction. The car service was splendid. In all, there were nine trains of flat cars; two of these were always being spotted before each shovel, two others were at the dump and three on the way from the shovel to the dump. Flat cars were used entirely as there was plenty of room for spotting. The material was hauled seven miles and used for making the Blue River Freight Terminal, which is now

Official figures indicate that the daily delays averaged between two and three hours per shovel. These delays could be attributed to blasting, moving up, waiting for cars, and passing trains, repairing, etc. The fact that it was possible to use plenty of powder for blasting was another factor influencing the output. Here, about 400 pounds was used in a hole, whereas on the grade reductions, it is possible to load a hole with but 115 pounds. The result of this will be dealt with later as far as the grade reduction is concerned. The greatest monthly output on the station site made during 1911 was 42,115 cubic yards in June. The material was for the most part shale, fairly well blasted. As a whole the station work was a comparatively simple shovel proposition; The train service was good, and there was plenty of room for tracks, and no interference with the main line and hence, no danger of obstructing traffic by blasts. This, of course, made

possible more thorough blasting than was possible on grade reduction.

At the present time the remaining excavation consisting for the most part of the construction of a mail and baggage subway, is under way. Halpin and Boyle are doing this work with an 18 B Bucyrus revolving shovel. The subway is being dug in an open cut, the material being wasted near by along the old O. K. creek sewer that formerly ran through the Terminal site. The total grade reduction is estimated to be 1,000,070 cubic yards although occasional sides may increase this to a small degree. On April first, 1913, 738,249 cubic yards had been removed.

account of the numerous viaducts. Furthermore, in order to disturb traffic as little as possible they had to be made extremely narrow. For instance, the first widening cut of the old main line was through twelve feet of shale overlaid by six feet of solid rock with fourteen feet of soil capping. This meant that the hardest digging was at the highest reach of the dipper, which added to the difficulty. Besides this, it was necessary to dig a solid rock wall which lined the original cut. The work was done by two 70-C Bucyrus shovels equipped with 3 yard dippers.

Another factor tending to reduce the output is the dump arrangement. The Southwest Boulevard

Blue River Freight Yards; Filling Under Way.

The grade reduction is a far different matter than the station work. In fact, it may be considered a complicated piece of shovel work. The extent of this work is shown well on the map. A few blocks east of Grand Avenue the cut runs up gradually to six feet in depth. Here there are six tracks or a width of about ninty-five feet. At the Paseo it is reduced to four tracks or about seventy feet, the original cut being thirty-two feet. Two blocks west of here, the heavy cut begins, which runs up to a maximum of forty feet, mostly all rock. This cut extends between Woodland and Brooklyn Avenues. From here on it gradually shallows out again.

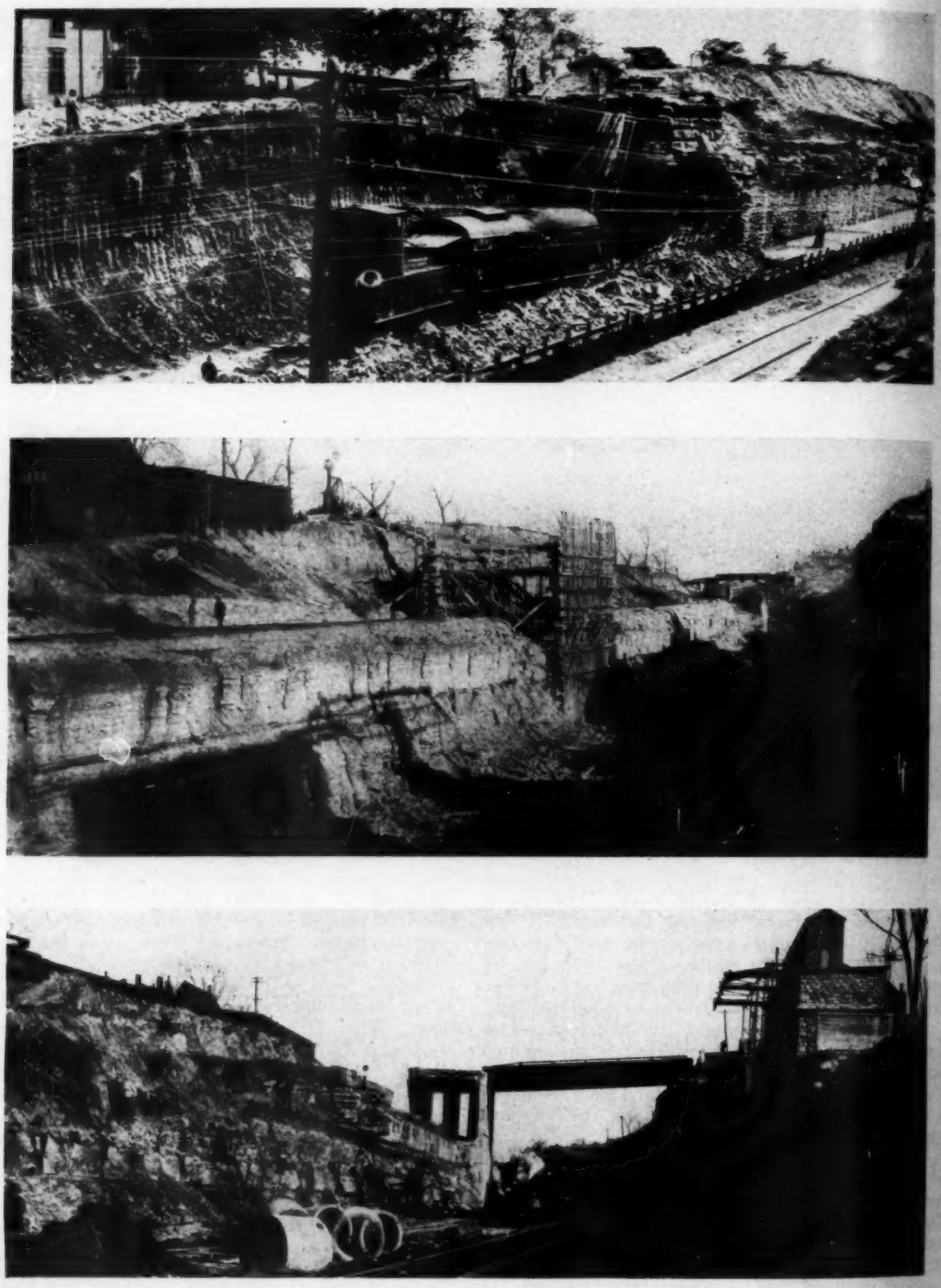
The excavation must all be done immediately off the main line, and one main track must be used as a loading track. Of course, great care must constantly be taken not to disturb traffic, hence the rock is very lightly shot. City ordinances, in fact, prevent heavy blasting within the city limits.

In all nineteen cuts have been taken through the heavy cut between Highland and Brooklyn Avenues. At first the cuts had to be very deep and short on

Yards are so thoroughly cut up with sewers that it is impossible to use flat cars to any great extent, inasmuch as unloading plows and Lidgerwood's have not enough room for operation. Hence twelve yard dump cars, Olivers and Westerns are being used. There is only room for seven cars at a time on this dump and most of the time there have been but four 12 car trains which is not enough to keep the shovels busy. The effect of this is shown on the records of average daily output, which is but 774 cubic yards per shovel as compared with 1444 on the station site. The average delay is five hours and over, as against two to three hours on the station.

It is hard to imagine more severe conditions than those under which the two Bucyrus shovels operated. Ever since the winter of 1911 the shovels have been in the hardest of digging. In a letter written in early April 1911, Mr. A. J. Stanford, the engineer on one of the shovels, writes;

> "I wish to state that my shovel has had the hardest work ever done by a shovel of this size. For two months I have had a thirty-six to forty-



Progress of main line grade reduction, Kansas City Terminal. Top view: cut just started, May 1911. Middle view: taken from same spot November 1912. Bottom view: cut to grade, Jan. 1913.

two foot bank with two to ten feet of blue shale hard as flint, and from five to six feet of lime stone rock except that the ledge is seamed in pieces from 3x12 feet to 8x20 feet, then 4 feet of cemented gravel, boulders and soapstone and the balance clay. This was not shot at all practically. I had to crack the larger pieces in the bank with dynamite after exposing a portion of the face, and get them by main force".

This condition has prevailed ever since, and the shovels are still standing up to their work as well as when they started.

In spite of this the output has kept very steady. We give below a table taken from the official records, showing the output of the two shovels for the six month period between April and October 1912.

Month	Shovel No.	Cu. Yds. Excavated	Shifts Worked	Cu. Yds. Per Shift
April	2001	13243	23	576
	2000	19044	33	577
	Both	32287	56	576
May	2001	13908	36	386
	2000	17346	56	310
	Both	31254	92	340
June	2001	24996	43	581
	2000	21814	44	496
	Both	46810	87	538
July	2001	24916	32	779
	2000	19079	30	636
	Both	43995	62	710
August	2001	15285	34	450
	2000	18475	32	577
	Both	33760	66	512
Sept.	2001	13127	29	453
	2000	18454	34	543
	Both	31581	63	501

During this period both shovels were in the big cut, the lime-stone ledge running to ten feet in thickness, intersected by mud seams. During the winter months it was almost impossible to drill accurately on account of a foot of water frozen solidly over the surface. The cut, furthermore was filled with water which could not be drained off on account of a street behind. In addition to the above a large percentage of the rock came in pieces too large to go through the dipper. A quick and satisfactory method of disposing of these was evolved by laying them up on edge against the dipper at such an angle that dobying threw the blast away from the shovel and hence kept the dust from the chain. As many as ninety shots per shovel were made frequently in one day. In spite of these difficulties each shovel averaged 105 cars of 11 cubic yards capacity a day with many long delays.

It is expected that the new station will probably be put into service this year. The improvements will involve an expenditure estimated at $30,000,000. As will be seen by the accompanying tabulation of data comparing the sizes of various terminal stations throughout the country, this will be the second largest railway station in the United States, being exceeded in area of ground covered by main building and by train sheds, only by the Pennsylvania Railroad station in New York. It is nearly four times larger than the Northwestern station in Chicago, 30 per cent larger than the new Union station in Washington and 83 per cent larger than the Union station in St. Louis.

We are indebted to Mr. E. P. Weatherly, division engineer and to Mr. A. J. Stanford, shovel engineer, for the foregoing data.

A Revolving Shovel's Output in Anthracite.

Mr. Walter Fahringer, superintendent of the Lehigh and Wilkes-Barre Coal Company, at Audenried, Pennsylvania, advises that their 18-B Bucyrus revolving shovel at Green Mountain, Pennsylvania, excavated in a period of ten hours on May 8th, 78 cars of anthracite coal and 40 cars of rock. As each car had a capacity of 115 cubic feet, this means that the shovel dug 503 cubic yards in this time. We illustrate herewith the machine referred to.

The operation was frequently interrupted by moving up. The face of the coal bank, was about 12 feet in height with a rock ledge overhanging, which fell down as the coal was excavated. This necessitated a large amount of rock handling, which naturally cut down the output.

A Dead One.

A recent number of The Excavating Engineer was returned to this office from a small Utah town for reason of non-delivery, and across the face the eminent Postmaster had written in explanation of this non-delivery the word "Diseased"—He did not state the nature of the ailment.

Reducing Street Grades at Pittsburg, Pa.

By M. K. Zimmerman

IT is not often that steam shovels are to be seen working night and day in the very heart of the business centre of a metropolitan city, but such is the case in Pittsburgh, Pa. now.

For nearly a quarter of a century Pittsburgh municipal authorities and many civic bodies have advocated the removal of that part of the city known as "The Hump District". From time to time this proposition came up before the Pittsburgh councils, but just as often the matter was referred to committees where in time the "papers" died.

A year ago, more progress was made, and a bond issue for the payment of the cost of the improvement went through with a whirl. Then came the time to let the contracts, and this was a matter of business that was soon attended to.

The well known contracting firm of Booth & Flinn of Pittsburgh secured this mammoth improvement contract, and soon after this, people who came to their work in the downtown district one morning were amazed to see large steam shovels being "planted" on the job.

The first shovel was put to work in Fifth Avenue, which is lined on one side of the street by the $3,000,000 Henry Frick Building and the costly Andrew Carnegie Building.

Continuing night and day, these steam shovels have been pushing their way through solid banks of clay soil with the result that excavating has progressed at a most remarkable rate.

Starting at Fifth Avenue and Smithfield Street, these shovels worked their way east in Fifth Avenue.

In some places, a cut of from eighteen to twenty feet has been made in the middle of the street, as the photographs show. This, however, means that

View of " Hump Cut" on Pittsburgh's busiest thoroughfare. The man on the ladder is in front of the Frick Bldg., with the Carnegie Bldg., next adjoining.

business houses must alter their buildings so that the entrances will be on the street level.

On the vacant site of the former Fifth Avenue Cathedral, a large steam boiler was placed in position, and this boiler furnished steam for the operation of a dozen or more drills. Explosives were put into these holes and after the holes had been "touched off" the steam shovels then started onward. One of the illustrations shows several of these drills at work in Fifth Avenue opposite an alley separating the Frick and Carnegie Buildings.

This same photograph also shows how far the sidewalks are to be lowered. In the case of the Frick and Carnegie Buildings, also the Allegheny County Court House and Jail Buildings, these buildings were built some years ago with the possible thought in mind that some day the "Hump" would be removed. The Frick Building is said to be four stories "under ground", while the Carnegie Building is also so built that only the sidewalks will have to be lowered and the ground floor entrance "will be ready".

It is possible that when the "Hump" job has been finished that between $15,000,000 and $20,000,000 will have been spent. All old business houses and residences have been or are being razed, and new buildings will take the place of these. The removal of the "Hump" in itself, however, is causing small expenditure, so to speak, when compared with the money that will be used in new building construction.

The following is the engineers estimate of the cost of the removal of the "Hump", as just announced by the Pittsburgh Industrial Development Commission:

Grading, 158,437 cu. yds. at $2.75	$435,701.75
Paving, 33,862 sq. yds, at $3.50	118,517.00
Curbing, 22,997 lin. ft. at $1.00	22,997.00
Crossing, 8,339 sq. ft. at $0.80	6,671.20
Sidewalks, 153,855 sq. ft. at $0.25	38,463.75
Total	$622,350.70
***Charge to Pittsburgh Railways Company:	
Paving, 8,378 sq. ft. at $3.50	$ 29,323.00
Relaying water mains	54,000.00
Re-establishing sewer system	111,330.00

***This item is to be deducted from the cost of the City's share.

Good Shovel Operation at Hazelton, Pa.

We illustrate herewith a 70-C Bucyrus Shovel owned by N. J. Cuyle and Son operating on the Lehigh Valley stripping contract at Hazelton, Pennsylvania. On April 6th this machine loaded 83 four yard cars in 53 minutes.

The material handled was a slate bank. As the cars measured 4¼ cubic yards, the shovel actually loaded 357 cubic yards in this operation.

The crew consisted of Geo. Pew, engineer, Wilson Evans, cranesman, and Charles Girkine fireman.

12-Hour Shifts at Panama.

Nine steam shovels are now working on a 12-hour shift in the Culebra Cut section, four having been added, on Monday April 14, to the five previously at work. Five steam shovels on this schedule are excavating in the Cucaracha slide, two have been set at work in the new movement of the break on the east bank, north of Gold Hill, which developed on April 16, and the remaining two are engaged in terracing the bank back from the edge of this break. The longer day of the steam shovels necessitates a corresponding lengthening of the schedule for the trains which serve the nine shovels, and these do not stop work now until 6.30 at night. The object of the extra shift is to make additional headway in the removal of the slide material.

His Catch

A man with a fishing pole sat on the river bank near the Atchison water works intake. "How many have you caught"? someone asked him. "When I get another I'll have one", he replied. —*Kansas City Star.*

A man whose trousers bagged badly at the knees was standing on a corner waiting for a car. A passing Irishman stopped and watched him with great interest for two or three minutes; at last he said:

"Well, why don't ye jump"? —*Everybodys.*

Steam Shovel Work in Low Grade Gold Ore, Black Hills, South Dakota.

THE Wasp No. 2 Mine at Flatiron, South Dakota, offers a very interesting example of the successful mining of low grade gold ore. The Black Hills was one of the first regions in the United States to adopt the cyanide process of treatment, it is here that some of the greatest strides have been made in its evolution, indeed it is not too much to say that nowhere in the world has this process been so perfected. The Engineering and Mining Journal in a recent issue published an interesting article on this mine by Mr. Jesse Simmons. We have borrowed from this article certain facts which will doubtless prove of interest from the actual operating standpoint.

Wasp No. 2 in former years, was a large producer of high grade smelting ores, but since the practical exhaustion of the high grade ores some 10 years ago, the company has given its attention to cyaniding. The mine is fortunate in having some natural conditions in its favor. The orebody is large, lies near the surface and can be cheaply mined. Its physical and chemical properties, furthermore, allow it to be easily treated at the mill.

The orebody, which is known as a camberian quartzite is about 20 feet thick underlying a plateau of 12 to 15 acres. At the low point in the plateau, the quartzite is covered by a foot or more of soil, at some places it is bare, the covering thickening toward the north and south. For many years the company will be able to work the orebody by stripping and opencut mining, but as the work progresses northward where the overburden is thicker, it will probably be necessary to do underground mining.

Tramming Ore from the South Side of the Wasp Open Cut.

Atlantic Type Class 25 Steam Shovel Stripping the Overburden.

The mine may be roughly divided into two sections, the north and south. Some slight differences are noticeable in the methods of operation on the two sides. The mining method at the Wasp No. 2 consists of stripping off the alluvium covering the ore, and then quarrying the quartzite. The most economical method of stripping has been found to be the steam shovel, where the character and depth of the stripping warrant its use. The shovel now in use is at work on the north side where the stripping is heavier. It was installed a year ago, and has been highly successful, materially cheapening costs. It is an Atlantic-type shovel, made by the American Locomotive Company., with a 1-cu. yd. dipper. It is purposed to use this machine for stripping during the warmer months only, shutting it down during the winter. When, as at present, the stripping is 10 to 16 ft. thick, the shovel's capacity for stripping is far in excess of the mining requirements of the north side. The overburden is composed of a foot or so of soil, and then compact shale and occasional sandstone. This is loosened up with black powder, holes being put down with air drills. One miner is employed a portion of his time drilling and blasting these holes in the overburden, and the remainder of his time in drilling and blasting ore. The steam shovel dumps into 18-in. gauge wooden side-dump cars, which are trammed to the waste dump, two men pushing a car.

After the top of the ore is cleaned holes are put down with 2¾ in. Ingersoll-Rand air drills to the bottom of the quartzite, and chambered two or three times with 40% dynamite. The last chambering charge consists of about 75 sticks of powder. Finally a charge of black powder, approximating 50 kegs, is exploded. This breaks 4000 to 6000 tons of ore so that it is possible to shovel 90% of it into the mine cars. The remaining 10%, which is too large to handle, is blockholed, Ingersoll-Rand "Little Jap" machines being used for drilling and dynamite for blasting.

Ore from the north side is shoveled into skids. On the south side, hand stripping is followed with occasionally plows and scrapers to remove the soil, where it is not too rocky. Except that it is done by hand labor, the system of stripping is the same as on the north side. About six feet of overburden is easily handled in this portion of the mine.

Skip tracks are not so convenient to this portion of the mine, and two methods of loading skids are used. One is to shovel the ore into 1-ton mine cars and tram them to bridges, crossing and skipway. The skips are stopped beneath the bridges and quickly filled, the cars dumping directly into them. The other method is to shovel the broken ore into 2-ton mine cars, and tram them to an ore bin, where they are dumped. From this bin the ore is drawn to skids and hoisted to the mill on night shift only. These large cars, of the same pattern as the cars used in stripping, are built with 2-in. planks, on a frame of 4x6 in. timbers. The bottom is protected by a sheet of steel. These cars are built by the company, and are cheap and servicable, and where side dumping is available, tramming is cheapened by their use. In the mine it is seldom necessary to tram more than 200 ft., unless conditions are such that the skip tracks cannot be placed any closer than that to the ore faces, a contingency that not often arises. The mine-car tracks are laid with steel rail, 18 in. gauge. Permanent track is laid with 40 lb. rail and spurs with 18 lb. rail. With two skids, operating on a double track skidway, and 25 shovelers and trammers working on ore, 500 tons per day are handled, except that about one-third of this amount is taken to the mill on the night shift, as explained.

The skip tracks are 48 in. gauge, laid with 40 lb. rails on 6 in. ties, spaced 24 in. between centers. The track is double for its entire length of 1200 ft. Two 5 ton skips, one operating on each track, are used. The skips automatically dump into the ore bin at the mill, above the crushers.

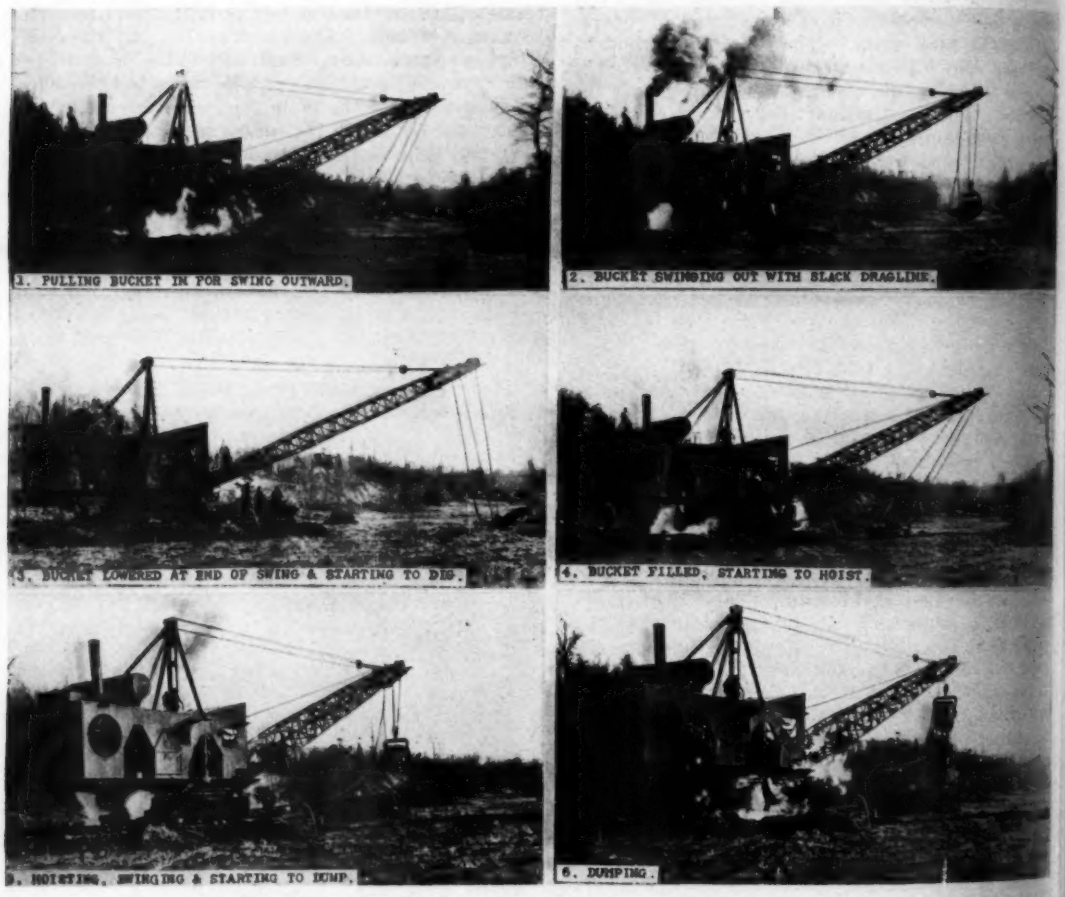
Loading Tram Car at Wasp No. 2 Mine.

The maximum grade of the skipway is 10 ft. in 100, and a 52 H. P. double-drum hoist, driven by electric motor, easily handles the load. The air compressor is at the mill, in the room housing the skipway hoist, and is a class NE-1, Ingersoll-Rand machine; it is single-cylinder, single-stage, cylinder 12¼x12 in., and at 200 r.p.m. has a piston displacement of 310 cu. ft. per min., delivering air at 100-lb. pressure.

During 1911 the total cost of mining was $0.5348 per ton, as shown by the annual report. The largest item of expense was labor, $43,770. Other costs included stripping $12,692; explosives, $5763, and power, $2722. During the year 160,860 tons of ore were mined and milled, for a yield of $286,160, of which amount $84,641 was profit. Of the profit, a total of $60,000 was disbursed in dividends.

Supplies cost about as follows, prices fluctuating from time to time: Black powder, $1.5225 per 25-lb. keg; dynamite, 40%, $13, cwt.; steel rails, $36.50 per long ton; lumber, $14 per M. These prices are figured f.o.b. Wasp No 2 spur, on the C. B. & Q. Ry. Labor costs are as follows: Shovelers and trammers, $3; miners and powder men, $3.50; steam-shovel engineers $4; steam-shovel firemen, $3; cranesmen, $3; hoisting engineers, $4. The mine payroll carries about 60 men, of which 50 are shovelers and trammers, half of whom are employed on ore.

Mr. John Gray is the General Manager of the mine. To his efficient management may be attributed a considerable portion of the success.


1. PULLING BUCKET IN FOR SWING OUTWARD.
2. BUCKET SWINGING OUT WITH SLACK DRAGLINE.
3. BUCKET LOWERED AT END OF SWING & STARTING TO DIG.
4. BUCKET FILLED, STARTING TO HOIST.
5. HOISTING, SWINGING & STARTING TO DUMP.
6. DUMPING.

Bucyrus Class 14 Dragline Excavator, digging Reservoir for City of Bridgeport.

Dragline Excavation on the Bridgeport Reservoir.

THE Bridgeport Hydraulic Company is at present engaged in constructing a reservoir outside of the City of Bridgeport, Conn. the purpose of which is to furnish the city with drinking water.

To supply this reservoir with water it has been necessary to divert the flow from Appetuck River into Cricker Brothers watershed. This has necessitated the excavation of a channel 6000 feet long 18 feet deep and 10 feet wide on the bottom, with side slopes of 1 on 2.

Owing to the nature of the ground it was at first problematical what method of excavation to pursue. The material was very hard consisting of a glacial drift, varying from sand, gravel and clay to boulders embedded in hardpan. The wooded character of the ground further complicated the problem.

It was finally decided to install a Class 14 Bucyrus dragline excavator, although the engineers were somewhat skeptical as to its capacity to handle the hard material. In fact, they stated they would be satisfied with an output of 300 yards a day. Furthermore, apprehension was expressed as to the ability of the machine to handle the stumps and roots as the path traversed was thickly timbered, as may be seen from the illustrations.

The excavator was carted to the job in two five ton motor trucks. One of these is now employed in carrying the coal to the machine, a distance of 8½ miles. Here is another instance of the adaptability of this class of equipment for contractors' service.

At the present time the machine is averaging about 800 yards a day, according to Mr. Senior, the superintendent. The operator, Mr. Robt. Adams, however, states it has dug at the rate of 30,000 cubic yards a month with the machine operating ten hour shifts. Some idea can be gained of the character of the digging by the fact that the dragline rope lasts about ten days and the teeth must be sharpened at the same rate.

As the machine advanced, the ground was cleared and the largest stumps, those over 12 inches were blasted. No difficulty was experienced in digging the roots. Although the bottom three feet of the excavation was in water, this did not slow up the work appreciably. The slopes were dug very accurately and the channel section has a very uniform appearance.

The labor cost amounted to $17.00 a day and the fuel $6.00 a day. The water for the machine was pumped from a small brook 100 yards distant. The coal, as stated above, was carted to the machine in a five ton motor truck. It cost delivered $4.50 per ton.

In reference to the adaptability of the dragline excavator to this particular job, Mr. Senior states that the saving in the method of operation has amounted to at least 10 to 15 cents a yard, and this despite the fact that this was, in the words of Mr. Adams, "the hardest job a dragline ever handled".

Bucyrus Company Wins Suit.

On February 18th the Supreme Court of Canada rendered a decision at Ottawa which will interest steam shovel users and contractors, particularly those operating in the Dominion of Canada. The decision was rendered in the suit brought by the Bucyrus Company of So. Milwaukee, Wisconsin, U. S. A., against the Canada Foundry Company of Toronto, Ontario. The case was tried before the Honorable Mr. Justice Cassels in June, 1912. The decision rendered at Toronto was in favor of The Bucyrus Company on all points at issue; but the case was appealed to the Supreme Court by the Canada Foundry Company. The decision of the Supreme Court dismissed the appeal of the Canada Foundry Company, taxing them with costs. The order of the Trial Judge at Toronto and the reasons for judgement given by the Supreme Court Judges are printed in full below.

This suit grew out of a contract made between The Bucyrus Company and the Canada Foundry Company under date of October 1st, 1904. Under the terms of the agreement, the Canada Foundry Company agreed to build, at it's shops in Toronto, steam shovels, wrecking cranes and pile drivers from designs furnished them by The Bucyrus Company, which had established a world-wide and enviable reputation for its machinery. Drawings for the 90-ton steam shovel, the 70-ton steam shovel and the 45-ton steam shovel were furnished to the Canada Foundry Company, and they built machines of these three sizes, but entirely disregarded their obligations to build either the Bucyrus wrecking cranes or pile drivers; and after the shovels built in Toronto had been put into actual operation and were tested out, The Bucyrus Company became convinced that the Canadian built shovels were not up to Bucyrus standards.

In 1909 the contract between the two companies was cancelled and The Bucyrus Company requested the Canada Foundry Company to return all drawings, blueprints, etc., to it, in accordance with the agreement; but instead of doing so they registered as their trade-mark, the words:—"CANADIAN-

BUCYRUS" and began the manufacture of the more recently developed shovels of The Bucyrus Company; advertising them as 60-C, 70-C and 95-C steam shovels; although they had never received drawings from the So. Milwaukee Company covering these machines. This was considered by The Bucyrus Company to be a direct attempt to deceive purchasers in the Dominion of Canada; and this impression was confirmed by the fact that the Canada Foundry Company copied, almost word for word, the proposal-contracts, specifications, and other literature issued by The Bucyrus Company. They even went so far as to issue a pamphlet, on the outside cover of which they had printed the words: **"Bucyrus Shovels—What they are Doing"**; and on the inside of the pamphlet they illustrated shovels which they were building in Canada.

The decisions of both courts are quoted below, and it will be noted that the trade-mark **"Bucyrus"** has now been entered on the trade-mark records of Canada; and hereafter the Canada Foundry Company will have to discontinue the use of the name: "CANADIAN-BUCYRUS".

Mussens Limited, with offices at Montreal, Toronto, Vancouver, Winnipeg, Calgary, Cobalt and Halifax are now the sole representatives of The Bucyrus Company, in Canada, for steam shovels, pile drivers, wrecking cranes, dragline excavators and ballast plows.

REASONS FOR JUDGEMENT.

In re Bucyrus.

The Chief Justice:

This is an appeal from a judgment rendered on an application made by the respondents to the Judge of the Exchequer Court, to expunge from the Register, the words "Canadian-Bucyrus", registered by the appellants as their trade-mark. That application was made necessary by reason of the refusal to register the words "Bucyrus" as the trade-mark of the respondents and the validity or propriety of that refusal falls also to be considered on this appeal.

Two questions therefore arise: (a) Should the appellants' trade-mark be removed from the register? (b) Is the word "Bucyrus" registrable as a trade-mark under the circumstances? The facts as to which there is practically no dispute, stated in their chronological order, lead irresistably, in my opinion, to the conclusion that the first question must be answered affirmatively. There may be some doubt as to whether the words "Bucyrus" can be registered as a valid trade-mark; but on that question also I agree with the learned Judge of the Exchequer Court.

The petitioners are an American corporation engaged, since 1879, in the manufacture and sale in the United States and Canada, and other parts of the world, of particular types of wrecking cranes, pile drivers, shovels and other railway appliances, and during the greater part of that period they adopted the name "Bucyrus" to distinguish their manufactured products.

These railway appliances speedily became known under the name of "Bucyrus" and the business of the company grew rapidly, their machinery obtaining a wide celebrity. It was sold invariably and solely under the name of "Bucyrus". All the machinery so sold had been prominently marked with the words "Bucyrus" printed on a name plate. The respondents began to sell their machinery in Canada, and on the first of October, 1904, they entered into an agreement with the appellants by which the latter were appointed sole and exclusive agents to make, manufacture and sell in Canada, the railway appliances described in the agreement as "Bucyrus" specialties. It was expressly stipulated that all such specialties manufactured under that contract should be

> "Characterized and distinguished under the name "Bucyrus", that this name shall appear prominently on the complete machines, and that the **method and system of marking adopted by The Bucyrus Company** on its own apparatus in the United States shall be followed as closely as practicable".

This contract remained in force until 1909 when, in the month of November of that year, it was cancelled by the appellants who continued thereafter, as they had done before, to sell steam shovels, cranes, etc. with the name "Bucyrus" upon them. As the appellants say in their factum by judicious advertising and adopting energetic business methods they established a large and prosperous business for the sale of products manufactured under that agreement. And in these circumstances they, in the month of February, 1911, obtained permission to register as their trade-mark the words "Canadian Bucyrus", to be applied to steam shovels, wrecking cranes and other railway appliances of their own manufacture. On or about the 7th of July 1911, the respondents also applied to register the word "Bucyrus" as their trade-mark, to be applied to their specialties which are the same as those manufactured by the appellants and that application was refused because of the prior registration obtained by the appellants. Hence this application to expunge from the Register the trade-mark "Canadian Bucyrus" and to register the word "Bucyrus" as the trade-mark of the respondents.

The respondents claimed and proved that in Canada as well as elsewhere the word "Bucyrus" had become (and was at the date of their agreement with the appellants) specially and exclusively distinctive of the railway specialties manufactured by them,

and that it had always distinguished such specialties from those of all other makers whatsoever and that the use of the word "Bucyrus" conveyed to the minds both of the trade and the public in Canada and elsewhere, tha the specialties to which it was applied had been manufactured by the respondents, or by the appellants under their license and by no other company, firm or person. On the evidence it appears to me conclusively established that the word "Bucyrus" has a particular signification and indicates the origin or manufacture of the thing to which it is attached. From the very first the word has been used to distinguish the machinery manufactured by the respondents from the machinery of other persons; it has been on the name plate attached to the machinery sold by them under the designation of "Bucyrus" railway specialties. I am consequently of opinion that the word "Bucyrus" is a good trade-mark (section 5) and registrable as such.

To the objection that a geographical name is not a good trade-mark, I reply by referring to: The Chartreuse case, 27 R. P. C., page 268; the Karlsbad case, R. P. C., 1912, page 162.

That the respondents' goods had been upon the market for many years known under the name of "Bucyrus" specialties is not an objection (see National Starch Co., Application, 1908, 2 Ch., 698).

To refuse to expunge from the Register the trade-mark "Canadian Bucyrus" would be to encourage unfair dealing. The object of a trade mark is not to distinguish particular goods, but to distinguish the goods of a particular trader. It is reasonably clear by the terms of the contract between the parties that the "Bucyrus" specialities meant to the ordinary public, machinery used in the construction of railways, made by a particular firm or company and that the respondents guarded themselves carefully against the contingency which has arisen. The appellants argue here that in their advertisements they are careful to say that the goods they sell are manufactured by them in Canada, but this is not a case of passing off. The question here is; Have the appellants the right to register as their trade-mark the word "Bucyrus" either alone or in combination with the word "Canadian"? The principle which, in my opinion, ought to govern in the case of an application of this kind is to prevent the use by two companies of names so nearly resembling one another as to be calculated to deceive. In my opinion, the use of the word "Canadian Bucyrus" is calculated to cause confusion. This is evident from the mere comparison of the two names. There is also abundant evidence that confusion would result from the use of both names. The word "Bucyrus", as I have already said, had long before this application been adopted by the respondents to distinguish the goods of their manufacture and by that name they were identified and known to the public. The appellants contend that they have under license from the respondents contributed to make a market for these goods in Canada. In that argument I find a complete answer to their case because it involves the admission that the word "Bucyrus" was to the public at the time of their application, a distinctive word and meant the goods of a particular maker of whose good name and reputation they seek to get the benefit.

For all these reasons I would confirm with costs.

DAVIES, J.

I would dismiss this appeal with costs for the reasons given by Mr. Justice Cassels in the Exchequer Court.

IDINGTON J.

When the contract of agency between the parties concerned herein was put an end to, the Canada Foundry Company had no higher right than anyone else to register as its trade-mark, one embodying the name of the Bucyrus Company.

Such a trade-mark was within the meaning of section 11, subsection (c) of the Trade-Mark and Design Act, calculated to decieve or mislead the public and hence properly expunged by the judgment appealed from.

The respondent company seems clearly to have used the mark the judgment gives it a right to register.

The fact that "Bucyrus" is the name of a town in Ohio, does not of absolute necessity in law prevent its registration.

The use of a geographical or other name might in some circumstances be good ground for refusing registration of a trade-mark containing such name. But the facts in this case disclose no such state of circumstances as to preclude either its use or the registration of the trade-mark containing it.

The appeal must be dismissed with costs.

BRODEUR J.

I am of the opinion that the appeal should be dismissed. I concur in the reasons given by Mr. Justice Cassels in the Exchequer Court.

Religious Opinion

"Come up and jine de army of de Lord, sister!"
"Ah done jine".
"Where you jine"?
"I jine de Baptis' Chu'ch".
"Lawdie, sister, dat ain' de army! Dat's de navy".—*Judge*

The Effect of Washing

"I won't wash my face"? said Dolly, defiantly.
"Naughty, naughty". reproved Grandmother. "When I was a little girl I always washed my face".
"Yes, and now look at it"! —*Ladies Home Journal.*

The Excavating Engineer

[FORMERLY STEAM SHOVEL NEWS]

A Monthly Publication Devoted to Excavating *and* Allied Subjects

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Review of Construction Work

During the first two weeks of May, railroad construction was brisk and prospects throughout the country looked much brighter than at the same time in April. The last two weeks however, have been quite quiet, although municipal work has continued to be active.

The general feeling among men in touch with affairs is that the present depression that is beginning to be felt is due to a number of contributing causes, none of which are of a particularly serious character. The let up therefore, may last for a time, but with the present prosperous conditions of country and the bumper crops it is virtually impossible for such a state of affairs to be anything but ephemeral.

The early part of the month witnessed a number of large size contracts placed. The Baltimore and Ohio awarded $6,000,000 worth of work on their Magnolia cut-off, a low grade double track line, eleven miles in length, on the east side of the Cumberland division. Much rock work and heavy construction necessitates a two year job. In Kentucky, C. D. Langhorne Construction Company has 21 miles of line to build for the Chesapeake and Ohio, J. H. Flick Construction Company of Chicago, have the contract for building the Grand Rapids and Northwestern R. R., a new line from Ludington to Grand Rapids; Joseph H. Sands Contracting Company of Roanoke, Va. has 60 miles of double tracking on the Atlantic Coast Line, and John F. Dolan of New York 50 miles on the Lehigh Valley, while numerous other small jobs were placed in Minnesota, Utah, Pennsylvania, Alabama and Ohio.

The latter part of the month was less active, no big or heavy work was let, but a number of small sized contracts were awarded, notably by the Fairchild & Northwestern Railway in Wisconsin to Alex McGavock; by the Southern Traction Company in Illinois to Lorimer-Gallagher Construction Company; by the Lehigh and New England to Curtis and Shumway, Inc. in Virginia, and others.

Of course the best zone for construction work is the Ohio flood district. Millions of dollars will be expended upon railway work and municipal repairs of every description.

Canada is booming. The Canadian-Pacific alone plans to expend $4,000,000 this year on new lines and improvements. The season here does not open actively as soon as it does in the United States, and we may expect some big work in this district in the near future, indeed by the time this issue reaches our readers tenders may have been called for the new Welland Canal, bids will be in about July 1st.

Change in Bucyrus Sales Organization

The Chicago office of the Bucyrus Company, 622 McCormick Building, is now in charge of Mr. Samuel E. Elmore, as Central Sales Manager. He takes the place of Mr. Carl Horix, who has recently tendered his resignation.

To Our Neighbor, The Grouch.

Mr. Griff Hughes, of Girardville, Pennsylvania, who has so frequently contributed valuable items to our field notes, has given us a picture of our neighbor, The Grouch, as seen by a shovel man. His ideas accord so with ours, and his statement, coming as it does from a man on the job, who knows whereof he speaks, is so forceful, that we print it in full below.

"Don't be a grouch! It is a very bad disease to get into your system, and when it gets there it is a very hard thing to shake off. It puts your regulating power into your top story and makes things fly while it lasts. For instance, some little trifling thing goes wrong and the very first thing you do is to take it out of your levers. They even catch the disease, and the next thing that happens is that your cranesman looks back at you and catches a glimpse of your beautiful face, consequently, he gets a touch of the grouch, and then, Oh you poor old steam shovel! Something goes wrong and she refuses to act as she should. You say, "it is easy to talk," yes, it is, but it is just as easy to take things coolly, if you know how. If you don't know how, it is never too late to learn, for it is necessary to bear in mind

that a steam shovel is as close to human nature as any machine that was ever built. Remember also, that a shovel costs more than twenty five dollars.

Humor is a great thing to practice, you can use it anywhere at anytime, or with any person, but grouch and humor cannot work together, so when you get grouchy you lose a few of your senses and your employers a few of their dollars.

Humor is the escape valve of life, and it often prevents explosions. It is not inconsistent with earnestness but rather makes earnestness appear delightful. If you get a touch of good humor you have all your fellow workmen with you and things will go along much more smoothly".

Steam Shovel Repairs and their Costs.

Very few contractors and steam shovel users understand the reason for the apparent high cost of repair parts and fewer yet anticipate their need for such supplies sufficiently far in advance. Indeed when a contractor purchases a steam shovel, he frequently fails to consider the repair item at all. This is more especially true of him who is purchasing his first shovel.

The manufacturer of a steam shovel must keep a complete record of every part of each and every shovel they manufacture. It is their aim and intention to keep a stock of the various parts of the different sizes of shovels. This not only necessitates a large store house, but clerks for keeping track of this stock and shipping it out. Some of the parts have to be boxed or crated; all of them have to be marked and billed; they then have to be carted to the freight house. In addition to the labor of recording, billing, marking, shipping and carting, there is insurance, the interest on the money invested, depreciation, repairs to store house, besides the proportional part of the overhead expense to be charged to the repairs. Compare the cost of shipping 70-tons in the form of a shovel on its own wheels and the boom, dipper and dipper handles which are all handled with a crane with the shipping of 70-tons in repair parts varying from pieces weighing from 2 to 4000-lbs. a piece, and you will wonder how repairs can be handled for the prices charged.

The manufacturer tries to anticipate the demand and to keep parts on hand to fill all orders promptly, but he is no more of a mind reader than the steam shovel user. Consequently he gets caught sometimes no matter how hard he tries to keep his stock ahead. As he only has his previous experience by which to be governed, it is indeed surprising to know that the percentage of orders which are delayed due to this cause is only about 5% of the whole.

One of the frequent causes for delay occurs when the repair part has been ordered from the camp or from the field, and insufficient information has been given to enable the manufacturer to fill the order intelligently. It is then necessary to go back with a letter or with a telegram. The camp may be a long way from town, and if the letter or telegram does not reach the camp for two or three days the customer will then get angry because the manufacturer did not make prompt shipment. If, on the other hand, the other course is taken and through incorrect or insufficient information, the wrong part is shipped, we again find trouble.

The contractor should bear in mind that the manufacturer has an interest in his steam shovel and is anxious to do everything possible to get his repairs to him at the earliest possible moment. For every hour that the shovel can be kept digging is so much in favor of the shovel, consequently it is well to impress on your men that correct and sufficient information in ordering repair parts, is very essential to a saving of time, which means money to the contractor. Following all telegraphic orders with a letter is excellent practice.

Another point of importance is to state on the order whether the parts are required immediately, or if not, upon what date they are wanted, also how and via what route they should be shipped. This practice is followed out by most contractors, but not all. The interests of steam shovel contractors and the steam shovel manufacturers are very close as one cannot get along without the other, hence it should be remembered that the grief is not always on the contractor's side, the manufacturer has some too.

Manganese Steel on Steam Shovels, Its Uses and Abuses.

Manganese steel has come to play a more and more important part in steam shovel manufacture, but like many of the other special steels it is limited in its practical uses. It is employed to advantage, however, for the dipper handle racks and pinions, and for parts of the dipper. One company indeed makes the entire dipper of this material.

The composition of Manganese steel is such that after it has been cast it is brittle and easily broken. A heat treatment, therefore is required and special care is necessary so that the whole casting be evenly heated. When the right heat has been attained the casting is then plunged into water, which gives it its toughness. If after being thus treated the steel is subjected to heat it will lose its toughness and wearing properties and return to the brittle state. It is therefore poor policy to try to heat manganese steel unless the treatment necessary in order to restore its toughness is thoroughly understood.

It sometimes occurs when a shovel is working during freezing weather, and the earth sticks and freezes to the front of the dipper, that the crew build a fire under the face of the dipper to thaw the material in order to remove it easily. This should never be allowed when the front of the dipper, the latch plate or the bottom band is made of manganese steel.

Cutting Through a Concrete Sewer with a Steam Shovel.

While at work on a grade reduction on the New York, Chicago and St. Louis Railroad tracks at East 105th Street, Cleveland, a Bucyrus 70-ton shovel unexpectedly encountered an 8 foot circular sewer. Through some mis-information this sewer was supposed to have been about 6 feet lower than it was found to be.

It was necessary to suspend work until another method of surmounting the difficulty was devised, or to proceed immediately to cut through the concrete. It was the middle of the night when this unexpected obstacle was struck. An investigation showed the volume of flow was exceedingly small and therefore there would be no objection to the latter course. This the shovel proceeded to do successfully. The accompanying photograph shows the appearance of the sewer the next morning. It was constructed of a first class quality of concrete, reinforced by $1\frac{1}{2}''$x$\frac{3}{8}''$ flat bars placed transversally 15″ center to center, and $5\frac{1}{2}''$ round bars on the top placed parallel with its length.

We are indebted to Mr. A. J. Himes, engineer, grade elimination of the New York, Chicago and St. Louis Railroad at Cleveland, Ohio for this photograph.

Cruel and Unusual

(From the Trenton, Ont., Courier.)

On Friday last Mrs. Josiah Shurey fell down stairs, spraining her wrist and bruising her otherwise.—*Chicago Tribune.*

March Shovel Records at Panama

The high record for the month was made by shovel No. 208, a 95 ton Bucyrus, working 25 days in the Culebra district, which excavated 51,128 cubic yards of rock.

The second best record for the month was made by Bucyrus shovel No. 207, working 25 days in the Culebra district, which excavated 50,152 cubic yards; 10,802 cubic yards of rock, and 39,350 cubic yards of earth.

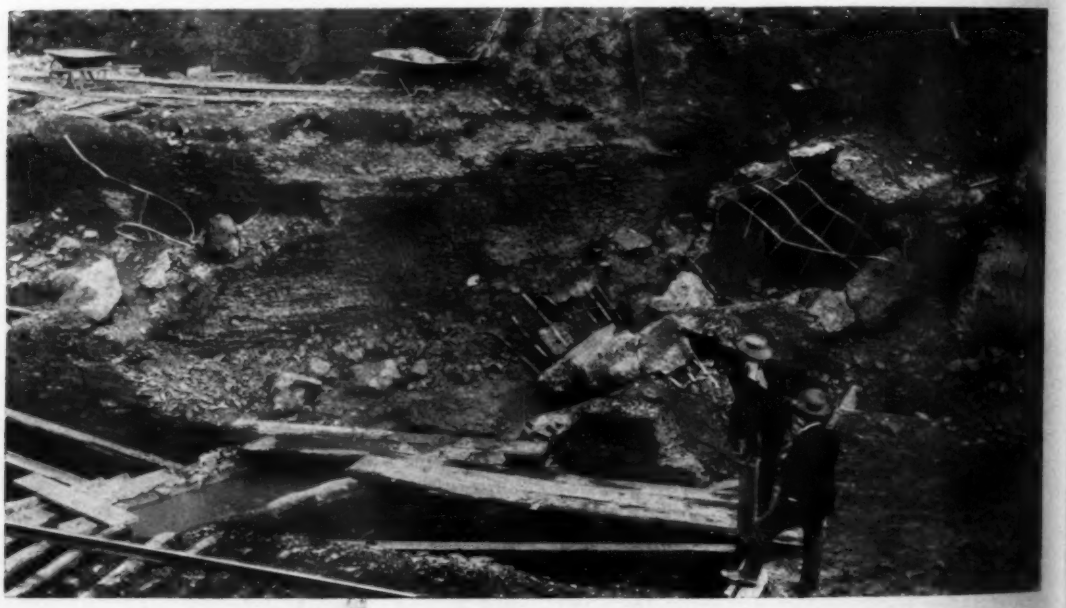
The best record for a shovel of the 70-ton class was made by shovel No. 109, a 70 ton Bucyrus, working 25 days in the Culebra district, which excavated 42,300 cubic yards of earth.

Bucyrus shovel No. 208, working in the Culebra district, made a high record for one day by excavating 2,940 cubic yards of rock on March 24.

Shovel No. 224, a 95 ton Bucyrus, working on a 12-hour shift in the Culebra district, made a high record of 3,743 cubic yards of earth on March 29.

From Maine to California

Said the man from California
To his friend from Bangor, Maine:
"Have you heard the latest slogan?
Have you caught the sweet refrain?"
Said the man from Bangor, "Yes Sir",
And they warbled forth this glee:
If you'r sure it's a Bucyrus,
Why it's good enough for me! —*E. G. L.*



Concrete Sewer Cut Through by the New York, Chicago and St. Louis Railroad's 70 Ton Bucyrus Shovel.

DISCUSSION IS INVITED FROM MEN IN THE FIELD ON SUBJECTS HERE PRESENTED

Instructions for Erecting a Knock-Down Shovel.

In our next few issues we will publish instructions for erecting a steam shovel which for one reason or another has had to be shipped very completely knocked down. On account of the varying circumstances under which shovels must be erected, these instructions are only intended to serve as a general guide.

The shovel chosen as a subject is a Bucyrus 40-R inasmuch as this size machine on account of its lightness is more often the type chosen for mountain work, or for operation in out of the way places where knocking down is necessary for convenient transportation.

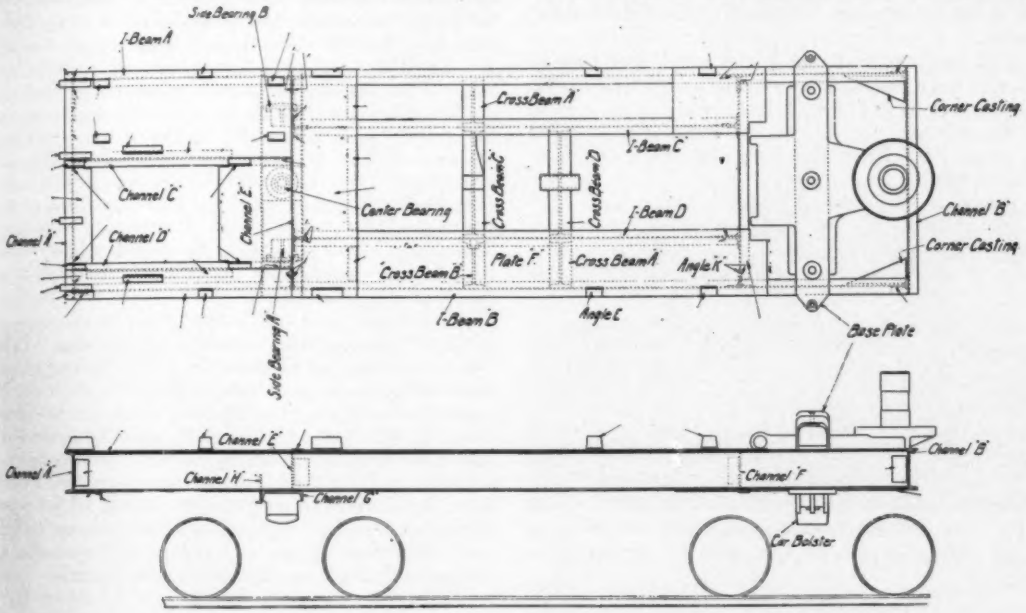
These instructions will be published as stated above in a series of chapters.

Car Body

First assemble the structural material of the carbody. These parts cannot be mistaken. The two long outside I beams ("A" and "B" Fig. 1.) may be laid on low horses or blocking. The upper flanges of these I beams have many more holes than the lower flanges and if this is born in mind there will be no danger of placing the longitudinal I beams upside down. The front corner castings indicate the forward end, and if these have been removed, they should be bolted in place immediately. The base plate casting should be put in place at the forward end of the car body. The pintal upward and frontward. The outside I beams "A" and "B" can now be bolted to the base plate.

The channel "B" which goes across the front end of the car body should now be bolted in place. In the middle it will be bolted to the vertical face of the base plate which is below the pintal.

The forward cross channel "F", which is slightly shorter than the end channels, goes across the car



body, just behind the base plate about five feet back from the pintel center. The flanges of this channel are toward the front.

The inside longitudinal I beams "C" and "D" can now be put in place. Their general position is shown in the sketch. The right hand I beam has a fairly regular row of $\frac{13}{16}$" holes on the inside half of the top flange.

The forward center cross beam casting "D" can next be put in . The forward side cross beam casting "A" goes in between the right hand side I beam "B" and the right center I beam "D". Both the above are about 11 feet from the front of the car. There

is no casting on the left side of cross beam, the space being used for the swinging drum.

The rear center cross beam casting "C" together with a rear side cross beam casting "B" on each side can then be placed two feet eight inches back of the foreward cross beam castings.

The pads on the top of both the front and rear cross beam castings have holes through which the engine frame bolts go. These bolt holes in the cross beam castings should be slightly to the right side of the center line of the car body. About nine feet forward of the rear end a channel "E" goes across the car, flanges toward the front. This channel is like that at the front end of the inner longitudinal car beams, but there are more holes in the upper flange.

The rear ends of the inner longitudinal car beams should be secured to the cross channel just mentioned.

A channel "C" 7 ft. long with a 2¼ inch hole in center is next fastened across the under side of the car body six and one half feet from the rear end. The flanges turn down. To this channel is rivetted a channel "H" 10 inches deep and three and one-half feet long.

The two longitudinal channels "C" and "D" 9 inches deep by 6¾ feet long upon which the boiler rests should next be placed. The flanges of these channels should turn toward the center line of car body.

The rear end cross channel, "A", can then be put on.

Up to this point the car body should have been bolted together temporarily with merely enough bolts to hold the different parts in place. These bolts should now be tightened, holding the different parts rigidly in place and in good alignment. The car body should now be rivetted throughout. The better the job of rivetting the less trouble the shovel will give after it has been in service some time.

Directions for Splicing Wire Rope

It is a plain, simple process, and but the work of an hour for anyone to learn.

The necessary tools—A hammer and sharp cold chisel for cutting off ends of strands, a steel point or marlin spike for opening strands, two slings of tarred rope with sticks (See Fig. 5) for untwisting rope, a pocket knife for cutting the hemp core, a wooden mallet and block.

First—Unlay the strands of both ends of the rope for a distance of ten feet each, or to the center mark, as shown in Fig. 2. Next, cut off the hemp cores close up, as shown in Fig. 2, and bring the bunches of strands together so that the opposite strands will interlock regularly with each other. (See Fig. 3.)

Second—Unlay any strand, A, and follow up with strand 1 of the other end, laying it tightly in open groove made by untwisting A; make twist of the strand agree exactly with the twist of the open groove. Proceed with this until all but twelve inches of 1 are laid in, or until A has become ten feet long. Next, cut A, leaving an end about twelve inches long.

Third—Unlay a strand, 4, of the opposite end, and follow with strand D, laying it into the open groove as before, and treating this precisely as in the first case. (See Fig. 3.) Next, pursue the same course with B and 2, stopping four feet short of the first set. Next, with 5 and E, stopping as before; then with C and 3; and lastly with 6 and F. The strands are now all laid in with the ends four feet apart, as shown in Fig. 4.

Fourth and Last—The ends must now be secured without enlarging the diameter of the rope. Take two rope slings or twisters (See Fig. 5) and fasten them to the rope as shown in Fig. 6; twist them in opposite directions, thus opening the lay of the rope. (See Fig. 6.) Next, with a knife, cut the hemp core about twelve inches from each side. Now straighten the ends and slip them into the place occupied by the core; then twist the slings back, closing up the rope, taking out any slight inequality with a wooden mallet; next, shift the slings and repeat the operation at the other five places, and the splice is made.

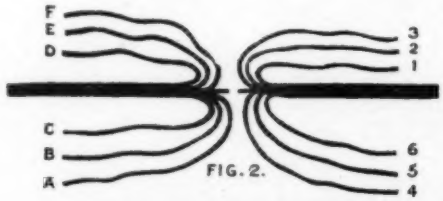


FIG. 2.

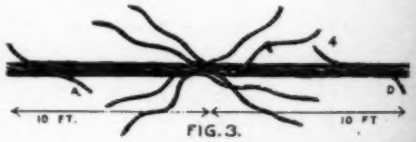


FIG. 3.

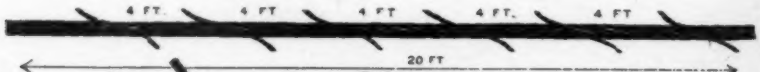


FIG. 4.

FIG. 6.

FIG. 5.

New Type Dump Cars

The accompanying cuts show a newly developed car which has many features of interest. A short time ago, it was considered impracticable to build a ten yard car and operate it on four wheels, as the distance necessary to be maintained between the wheels would inevitably have the result of throwing the car off the track in rounding the small curves, or uneven tracks incidental to contractors work. To overcome this difficulty, the main truck sill has been articulated, permitting all four wheels to transmit their full share of the load to the track at all times. However uneven it may be, one wheel can be forced over an obstruction 4 in. or more high without taking any of the load off the other three, as the front and back half of the main sill can move around their axis independent of each other.

It is a well known fact that an axle of a truck when broken is always fractured inside the wheel, showing that the break is due, not to the overhanging of the load on its journal, but to the fact that the opposite wheel is held in the air in going over an uneven track by the rigidity of the truck and transmitting its load through the axle to the opposite wheel, and exerting an enormous bending moment at this point, which the articulated sill entirely eliminates.

Seventy of this type of car have been working at the Kensico Dam on the Catskill Aqueduct for the last year without mishap of any kind.

Another feature of this car is the ease with which it is dumped and righted, both operations being automatic. Every advantage has been taken of the laws of gravity, and the conditions carefully studied. When the car is being filled, it is slightly overloaded on the side which happens to be the dump side. Consequently it is only necessary to break the chain as shown in the cut and the car body gently rolls over. When the load is dumped, the car rerights itself without help of any kind and the operator locks the chain, completing the operation.

The automatic rerighting is obtained by an ingenious arrangement of the door and door bars in connection with the truck, whereby the door is lifted (due to the dumping of material) to such a position that the center of gravity of the body including the door is moved to the far side of the main body hinges.

The car body sill has a flexible construction so that it will not be unduly strained even if one of the wheels is raised six inches off the track.

The car is equipped with M. C. B. draw bar and coupler, as safety appliances are now given as much thought in connection with a contractors outfit as is given to railroad operations, pockets are attached to the car body and corresponding latches to the door. As the car body is righted the latches slip into their respective pockets making the car dirt tight and distributing the stress in the door when loaded. The door is hinged in such a manner that if an extra large boulder is loaded on the car it will, when being dumped, raise the door, swing it on its hinges and make a passage for itself.

The Kerbaugh 8-yard Car.

The Kerbaugh 10-Yard Car.

This car was built to meet the unusually severe conditions encountered in quarry work. The material handled being principally large granite rocks, some of them five feet square by seven feet long, weighing approximately 8½ tons. The crusher to which they are fed has a like capacity. The cars are loaded by means of the largest steam shovels having 5 cubic yard dippers, consequently the floor is very strong, being composed of 4 in. oak plank lined with ⅜ in. steel plate, the door being also lined with a steel plate.

All the castings except the truck boxes and wheels are made from open hearth steel so as to combine strength with lightness.

Air brakes are now applied to give them still greater efficiency.

These cars were designed and manufactured at the Bellwood Works of H. S. Kerbaugh, Inc.

Welding and Cutting by the Oxy-Acetylene Process.

The application of the oxy-acetylene process of welding and cutting covers a great variety of work and has been the means of vastly improving many lines of manufacture, reducing costs over old methods in others and entirely revising the methods followed in the razing of steel structures and other work involving the cutting of metal of heavy dimensions or where it is more or less inaccessible.

The welding of boilers, tanks or cylinders, where strength is a necessary factor, can be done so well that the parts become practically one piece. In making repairs to such work by cutting out defective portions and making flush welds this system affords a most economical and convenient method.

Defective castings may be redeemed by welding up blow holes or adding lugs or bosses when they have been inadvertently left off from the pattern.

Cutting off risers or necks from castings is another use to which the oxy-acetylene process can be put with advantage. Welding up holes drilled in the wrong place and building up low spots and other defects in either iron or steel castings are also readily accomplished.

Repairs in the field, which might require weeks to accomplish if sent to the factory, is another line of usefulness and parts so repaired are as good as new.

The welding of wrought and steel pipe headers and manifolds of any size and the rapid repair of cracks or leaks in the pipe lines are also easily accomplished.

The Alexander Milburn Co. of Baltimore, Md., specialize in apparatus for this work. Their success in the field is attributable to their policy of building the best possible apparatus rather than to the low price. The acetylene generator, used in connection with the process, is a modification of their "house machine", used for residence lighting.

The feed is rotary and of the indirect carbide into water type which makes it impossible to get an excessive charge of carbide, or to feed in any way except through the normal working of the generator. It uses lump carbide which gives 15 per cent more gas than the granulated size.

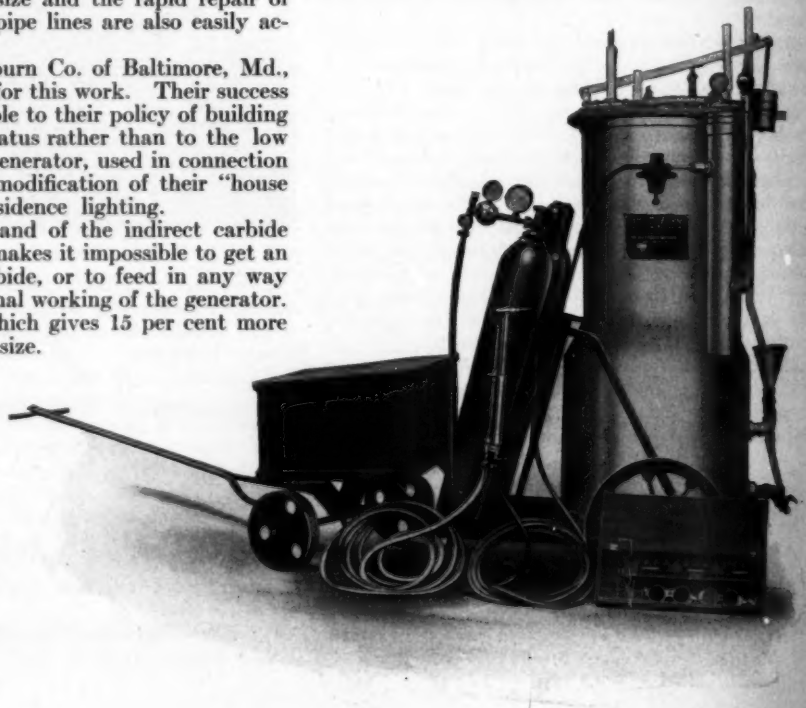
The operation is very simple. A horizontal cylinder within the carbide hopper is revolved by the gas pressure acting upon a strong diaphragm, and thus feeds the carbide. As the gas is used and the pressure falls a weighted lever rotates the cylinder, and feeding a predetermined amount of carbide, renews the gas pressure and raises the diaphragm and lever. The feed is sensitive and accurate and maintains the pressure desired regardless of the amount of gas being used. The gas is washed, cooled and purified as fast as it is made and used.

In the Milburn Welding Generator the carbide chamber is sealed at all times against the moisture in the base of the generator. This is one of the most important details possible to an Acetylene generator and one which has been much overlooked. The generator also has a simple locking device which will prevent any accidental feed of carbide while the generator is being moved or recharged.

A working pressure of 7 to 10 pounds is suited to most work, but this generator is readily adjustable to any pressure desired from 2 to 15 pounds by adjusting the weight on the lever.

The Company have been inventors and manufacturers of Acetylene Apparatus for the last 14 years and their patented Acetylene devices are world known. They have successfully manufactured and marketed over 75,000 Acetylene generattors of difierent types, which are adopted by builders, architects, machinists, engineers, railroads and government departments.

The Company has a number of trained agents throughout the United States, Canada, England and the Colonies, and are prepared to quickly send practical welders and experts to its customers.



Alabama

Local—Gulf, Florida & Alabama Ry. has awarded the contract to the J. T. McCarthy Co., Gainesville, Ga., for the grading for the construction of its extension from Local, Ala., north, 20 miles.

Montgomery—The contract has been awarded to O. J. Pruitt, Montgomery, for the construction of a railroad from Alexander City, Tallapoosa County, to Kowaliga, Elmore County, a distance of 15 miles.

California

Los Angeles Notes
By G. H. Hutchinson

Mr. Joe Eckersley, better known as "The Loving Kid", was in the city a few days ago renewing his acquaintances with the soubrettes of a very popular cafe'. From all appearances the pleasure of his visit was mutual to the parties concerned. The last seen of him he was just hitting the high places getting out of town.

Mr. Ernest Ward, newly elected Mayor of Mulholland, a flourishing suburb of Los Angeles, was in the city last month and gave a big banquet in honor of the election. Judging from the various brands that are usually retained under a cork that were in evidence on the banquet table we would assume that Mulholland is going to be a dry town. Billy Gallagher was toast master in his usually happy style. Tom Littlefield was property man and made good as he usually does. The affair broke up at a late hour and we are pleased to say in good order.

Walter Hodges, of the Pacific Rock & Gravel Co. is moving his Thompson Bucyrus shovel from his plant on the Pacific Electric tracks to the new plant at Butler on the tracks of the Santa Fe where he is opening up an extensive pit in the San Gabriel River bottom. In about 30 days a 60-C Bucyrus shovel will arrive for the new plant. Mr. Hodges is a live wire and furnishes a large proportion of rock that is used in and around Los Angeles.

J. Hughes, employed by the Pacific Rock & Gravel Co., went joy riding last night with a Thompson Bucyrus shovel. While the machine was built years ago Hughes says it can go some. We have not heard whether he exceeded the speed limit or was in danger of getting pinched for obstructing traffic. We understand he lost the biggest part of the machine before arriving at his destination, as well as himself. He was discovered about 6:30 the next morning wandering around in the Cacti with a sack that was said to contain a dozen. Did not learn whether it was imported or domestic, probably the latter as he is a booster for home industry. When discovered he had on two suits of clothing. He says it gets cold joy riding at night even in California. Hughes finally got the machine to its destination and is still on the job and seems to be no worse for the wear, for his experience.

Jack Harriman is in the city and we understand he is captain of the Water Wagon Squad, but states he is willing to give up his seat to a lady at any time, and further states that he is at all times able to tell his name and give the number of his residence and can find the place without the aid of a city chart. We are requested to caution the shovel men to leave that 7-11 stuff alone as they are getting too strong.

Chris Keller, southern representative of the A. U. and family are at Marietta Springs recovering from an experience that happened at Chris' house recently. We understand it is a boy. Last reports were that Chris was convalescent. At Chris' place of business yesterday one of his old acquaintances was unkind enough to say he hoped Chris would shrink enough before he came back so that he could at least get through the door. If Chris should take a turn for the worse The Excavating Engineer will be duly advised.

Jim Riordan, master boilermaker of the Los Angeles Aqueduct, who for four years looked after the shovel boilers, is in the city enjoying a much needed rest. We found him very busy yesterday afternoon in Chris Keller's office planning a new boiler that he believes will be fool proof. He says there are so many bum shovel men in the business now that a boiler maker has a hard job keeping up.

Oscar Burke, one of the crack shovel busters, advises he is going north in a few days for Hunt Bros. to see what he can do taming a Model 61. The work, we understand, is to be north of Willets, California.

John Anderson, who was said to be the busiest man on the Aqueduct, who held a position there as shovel master mechanic, left night before last to erect a Model 61 for Hunt Bros. in the north. John came in to see us a day or two before he left and promised to come back and renew his acquaintance which we very much hope he will do. John is such a good man he ought to be erecting Bucyrus shovels so as to keep all the good things together.

Here are a few of the shovel men who are in town at this writing:

Oscar Burke, Blondie Burke, Joe LeBel, Billie Cahill.

Hank Riebel is at Marietta Springs for 10 or 12 days and we are very curious to know just what is the matter with Hank. One of his associates told us it was rum-atism. His speedy recovery is looked forward to by his associates as it is lonesome at the U. S. without him.

William Ward, well known to everybody on the coast as an expert shovel tamer, has been employed for several years by the Pacific Rock & Gravel Co. He is at present getting a Thompson Bucyrus started and is looking forward anxiously to the arrival of the new 60-C.

Arthur Harper, running a 60-C for the Pacific Rock & Gravel Co., called us up on the telephone just after we had returned from church and judging from his location at the time of telephoning he was not at church, nor was he on the 60-C. Ben Fraser is craning for him and we are undecided as yet whether Ben is guilty.

Canada

Havelock, Ontario—G. P. Enaney is operating a 70-C Bucyrus shovel for the Canadian Pacific Railroad at this point.

Montreal, Quebec—The contract has been awarded, it is reported, to M. P. McGrath, Worcester, Mass., for the construction of about 406 miles of railroad from Montreal, Que. to Ottawa, Ont., and the Great Lakes.

Woodstock, N. B.—A. L. Van Dyke has resigned his position with C. A. Dineen Co. at Chester, Mass., and is now operating a shovel for Kennedy and McDonald here.

Montreal Notes

John Buist and T. Duval are engineer and cranesman respectively, on a 100 ton Marion shovel working for the Courtenay Construction Company at St. John, N. B.

One of the largest dredging jobs, which has come up in Canada, will shortly be let for the new harbour improvements in Toronto. There will be approximately 35,000,000 yards.

The city of Montreal opened tenders last week for the widening of the Aqueduct. There were seven tenderers, the lowest being the Cook Construction Co. of Minneapolis, Minn. and Sudbury, Ont. This tender was $2,322,562.00. The next lowest was Quinlan and Robertson, Montreal, $2,621,180.00. This job comprises about 2,300,000 yards of earth excavation, 400,000 yards of rock and 200,000 yards of concrete, all within five miles.

Colorado

Notes from Denver and Vicinity
By H. N. Steinbarger

D. S. Gerow is in Denver, his home town, telling all his friends how pleased he is with his new contract in Utah, on the new line of the Utah Railway, "Coal Road". It was necessary to move in about seven miles from Helper, Utah. This was accomplished in record time and good progress is being made on the work. The material is largely hard rock, and "D. S." is keen for it as he believes his outfit is always equal to the occasion. It comprises a 70 ton Bucyrus shovel, three 18 ton Vulcan dinkies and about forty 4-yard Western cars.

Dan Griffin, the general manager of the Kilpatrick Brothers' Denver office, is again in Salt Lake City. He returned from there last week but only remained in Denver two days. If Denver isn't careful it will lose a mighty good resident. We admit that the breezes from the Great Salt Lake are enticing.

The Christensen Construction Company of Salt Lake City, recently installed their third 70-C Bucyrus shovel in the new double track D. & R. G. Ry. job near Tucker, Utah. It has been used for some time in casting, but will soon run into a thorough cut. They have just placed their order for two additional Vulcan dinkeys 10 x 16–18 ton size. They swear by Vulcans and now have six of the 18 ton size.

M. P. Leahy, a shovel engineer of Denver, is home for a short stay, daily interviewing a dentist. Mike says its a "durn sight" harder work than working double shift. He recently operated a new 70-C Bucyrus for McArthur Brothers at Miami on their Inspiration Copper Company contract. Too hot in Arizona in summer for Mike.

The Utah Construction Company, Ogden, Utah, have just placed in service a new model 61 Marion shovel. In the last few months they have purchased about five Marion and seven Bucyrus shovels for various contracts. They control enough shovels now to build the Panama Canal.

W. W. Brown, Salt Lake City, has "moved in" a new 70-C Bucyrus and complete plant on the new Utah Railway work near Helper, Utah. He sure is pleased with his plant and the big chance to make a record this summer.

It was announced last month that Twohy Brothers had been awarded contract by the Burlington Railroad, connecting link from Orin Junction in their Seattle to Gulf Line from Orin Junction Wyoming to Powder River, Wyoming. This connecting link is 110 miles long, and will complete the Burlington connection from Seattle, Washington to the Gulf of Mexico. The Great Northern, the Burlington and the Colorado & Southern is comprised in this line, and it is expected that large and prosperous sections of the country that heretofore have been without modern railway facilities will be very greatly benefited.

Twohy Brothers are making their headquarters at Casper, Wyoming, and it is understood the entire work will be carried under the supervision of the engineer and manager, Mr. M. W. Bethel who has had a world of experience in both railroad and engineering and construction, and has made a record in placing sub-contractors on this work. The Burlington Railroad Company's interests are being looked after by A. L. Hoagland, chief engineer for the work, and also district engineer Wright.

Judge Twohy and his son Robert E. Twohy took a great deal of interest in this piece of work, having spent considerable time in Casper organizing their forces and letting sub-contracts.

Sub-contracts have been let to Timothy Casey of Boise, Idaho, who will move a Bucyrus steam shovel outfit on to the work. Ed Wren of Portland, Oregon took over a large amount of the work, and it was understood that some of Wren & Greenough shovel equipment will be used. The section he was most interested in was from miles 80 to 84. These two jobs comprise about all of the steam shovel work on the line. However, it is understood that some sections of the work is ideal for dragline excavators. J. L. Mullen, Lincoln, Neb., has mile 69 which is near Vetterman, Wyoming. He has already shipped out one of his dragline excavators from Lincoln. It is also reported that P. J. O'Leary of Denver, Colorado is now erecting his dragline on another piece of this work.

The team work, some of it elevating grader, the majority more suitable for fresnos has all been covered very thoroughly, the majority going to Barker Brothers Construction Company, Denver, Gilbert Brothers, Denver, C. R. Conover, Denver, and Davies & Donovan, of Denver. The Davies of this Company is very well known throughout this section, also in Kansas City and Omaha, as one of the most efficient laborer producers in the country, his company in Denver being known as the Western Railroad Labor Agency.

Charlie Barker, Maurice Gilbert, C. Conover, Jimmie Davies, together with Pat J. Kane of Laramie, Wyoming, "Dr. Watson" Jewett, representative of the Western Wheeled Scraper Company, and H. N. Steinbarger representative of the Bucyrus Company were all in Casper at the same time. We are informed that there was something doing every minute in other directions than taking Burlington contract work. Every one of the above contractors made a record in going over the line and selecting their work, and it is stated that all records were broken in moving in after the contracts had been let.

J. Fred Roberts Construction Company of Denver, has taken about 10 miles of the work and sublet a considerable amount. Roberts has made a name for himself as having one of the finest team outfits to be found in the country. He is certainly strong for mules and employes them exclusively in his work. From all reports he will have about 75 teams of the finest Colorado and Missouri mules that ever went out on railroad construction.

W. A. Colt & Son, Las Animas, Colorado has about 150,000 yards of the Burlington work near Powder River. He moved the greater part of his outfit across country from Laramie, Wyoming the site of his last operation. It is understood that Sam G. Miller of Laramie, Wyoming who has some of the Burlington, Wyoming, work and also Pat Kane moved their outfits across the country.

Pat O'Connor of Casper, Wyoming the last but not the least contractor that we know of having taken work was right on the job at the letting. He took miles 145 and 146, and have a big outfit ready to move on. O'Connor has made headquarters at Casper for sometime and lately has been building some water supply reservoirs for the Burlington Railroad in the neighborhood of Powder River.

Not very long ago there was quite an array of contractors in Casper all drawn there by the fact that a real bargain in a steam shovel outfit was to be sold to the highest bidder. There was A. B. Bennett of Helena, Montana, also Nels Roman of Spokane, Washington, Claude Siems of the Siems Carey Company, Barney P. Wickham of Wickham Brothers, Council Bluffs, Iowa, Fred Kerr representing A. B. Cook Company of Helena, Montana were all bidding on the shovel. They had no interest in the letting of the Burlington work merely drifted into Casper with the idea of picking up a real bargain. The outfit comprised a 70-C Bucyrus shovel, three Vulcan 18 ton dinkeys, and about 30 Continental dump cars, traction engine, water pipe,

pumps, and in fact an entire and complete outfit. Barney Wickham scared them all off early in the game and took the entire outfit. He expects to move it in the near future on some of his various jobs. The outfit was in excellent condition having been used only on one piece of work. It is needless to say that Barney was very well satisfied with his trip. From all accounts we judge that the Twohy Brothers Company, made a record in covering their work; dirt is flying along the entire line even though weather conditions have been the worst experienced for several years. Every effort is being made to complete the line from Powder River to Casper by July, and from all indications this will be accomplished.

Work on the Denver & Rio Grand Railroad Co., new line, near Tucker, Utah is progressing very rapidly under the management of the Utah Construction Co. who has the general contract. Fifteen miles of double track is being built, to reduce the present 4% grade to a 2% grade. The work is probably about 60% complete and from all reports will be finished on schedule time. The Utah Construction Co., has sublet all but approximately four miles which they are constructing with their own forces.

Charlie Dooling of Dooling Bros., now located on the D. & R. G. Ry. work at Tucker, dropped into Salt Lake City recently. Charlie is the "man on the job" and as their job is large, employing a Marion and a Vulcan shovel on double shift, it is not quite clear why he came to town. His replies were rather evasive. Only one conclusion. There are lots of pretty girls, eligible girls, in Salt Lake, and Charlie is a bachelor.

Robert Dooling of Dooling Bros. Tucker, Utah, John S. Young of Young & Crook, Denver, D. S. Gerow, Denver, Maurice Gilbert, Lamar, Colo., George Allen of Allen & Lafferty and Jimmie Davies, Denver, were all in town for several days last month. They all have contracts in the several directions of the compass from Denver, but—well, they must get in once in a while and get together to wear off some of the dust of camp life. Some pitch players that bunch.

The Corey Brothers Construction Company came near having a serious accident about a month ago when moving their equipment onto their new job on the D. & R. G. Ry. at Tucker, Utah. All the apparatus was hauled up a 10% grade on cars by means of a hoist. It seems that the cable which was attached to the car carrying the boom of their Atlantic shovel, broke, and the car ran down the hill and jumped a considerable distance. Fortunately only about five dollars damage resulted to the boom and machinery but it is reported that the steel freight car was considerably broken up.

Denver—Missouri, Kansas & Texas Ry. is contemplating the extension of a line through southeastern Colorado to Denver. Surveys have been made from Forgan, Okla., the northwestern terminal of the line in that state. S. B. Fisher, St. Louis, Mo., is chief engineer of construction.

Florida

Arcadia—Contract for the construction of main ditch and 16 laterals in the Murdock Drainage district, requiring excavation of 600,000 cubic yards, was awarded May 6, 1913, according to one report, to John M. Murdock of Murdock, Fla. Another report from an official source states that the contract was divided between the Murdock-Boyd Co. of Chicago, Ill., and Jacksonville, Fla., and the Southern Drainage & Construction Co., Kinston, N. C. This letting attracted quite a number of contractors. Cravens & Kimmel, Arcadia, Fla. are the engineers.

Georgia

Augusta—Carolina & Georgia R. R. has awarded the contract to Michael P. McGrath, Worcester, Mass., for the construction of its line from Augusta to Columbia, Ga., about 75 miles. G. E. Shand, Augusta, Ga., is interested.

Illinois

Chicago—The Grand Rapids & Northwestern R. R. has awarded the contract for the construction of the new railroad from Ludington, Mich., to Grand Rapids to J. H. Flick Construction Co., 37 W. Van Buren St., Chicago, Ill. Actual construction work will be commenced at once and it is expected to have steel laid before winter.

Chicago—The Chicago & Alton has started work on heavy grade reduction between Atlanta and Lawndale, Ill. The work includes the handling of about 1,000,000 cubic yards of earth and will be done with company forces.

Springfield—Articles of incorporation were issued April 30, to the Springfield, Taylorville and Pana Interurban Railroad Company. It is proposed to construct the road from Springfield through the counties of Sangamon and Christian, through the City of Taylorville, to Pana in Christian county. The capital stock is $325,000. The incorporators and first board of directors are: W. B. Adams of Taylorville, and P. E. Ballet, George H. Backer and H. V. Gehm of St. Louis. Mr. Gehm is president and Mr. Backer treasurer of the St. Louis Railroad and Equipment Company, which has the contract for building the new road. It is the expectation of the promoters to have the line built from Taylorville to Pana by October 1, 1913, the other end being built next spring.

Iowa

Tom Poole and Hugh Glenn are operating a class 24 Bucyrus dragline excavator for Morris, Shepard and Dougherty at Sabula on the Chicago, Milwaukee and St. Paul. John McCoy is in charge of the work and Leo Maloy is book and time keeper.

Kansas

Notes from Pittsburg
By W. S. Russell

There is but little change in the coal situation from last month. The market is dull and a number of underground mines are working on half time. The coal stripping steam shovels are all working, which demonstrates that they can hold their own during the dull period. Prices hold steady and we quote from circular of a coal mining company as follows:

Soft lump, $2.00. Nut, $1.75. Slack, $1.50 to $1.35. Mine run, $1.60 to $1.65, f. o. b. cars at mines.

The weather is fine with occasional showers, moderately cool and suitable for out door operations.

Pittsburg is prosperous and growing. New buildings are going up. A large amount of street paving is being done and the hotel registers show people coming here from all over the United States. There is over half a million dollars paid out here every month by the coal mining companies and on Saturdays the streets are crowded. The only drawback to Pittsburg is its dirty streets, and it is a wonder that the business men don't rise up in just indignation and compel those who are responsible to clean up and keep them clean.

Robert Nesch of Kansas City, president of the Pittsburg Paving Brick Co. was at the Stilwell hotel for several days last week.

Mr. L. C. Jackson, president of the Jackson-Walker Coal Company of Wichita, Kansas spent a few days at Pittsburg recently looking over coal stripping operations.

Mr. Frank W. Pierce of Sharpsville, Pa. has arrived at Pittsburg and is stopping at the Stilwell hotel, where he will remain to look after the affairs of the Pierce Coal Company, a new coal stripping firm who have bought a fine piece of coal land near Mulberry and will install a first class plant during the summer.

The new 150 ton Bucyrus steam shovel purchased by the Moka Coal Company of Pittsburg is being installed on their

field near Mulberry, Kansas. Lee Bigley is the coal company's superintendent and E. P. Hayward has charge of its erection for the Bucyrus Company.

W. D. Leonard of St. Louis, representative of A. Leschen & Sons Rope Company was at the Stilwell hotel for a day or two recently.

Ed. D. Packard of Packard and McWilliams Coal Strippers was at the Stilwell hotel one day last week.

Wm. Haynes of the Haynes Coal Mining Co. of Arcadia was at the Stilwell hotel the other day and wore his usual smile.

A. H. French, Sec'y of the J. J. Stephenson Coal Company left on the 11th of May for a three weeks vacation at Excelsior Springs, St. Joe and other pleasure resorts for a much needed rest.

The Pittsburg Machinery Company have secured an order for a seven ton dinkey locomotive with 7 x 12 cylinders, having special features not usually found in this type of engine. The fire box is made of copper has copper tubes and copper stay bolts, and all journal bearings are lined with gun metal. This locomotive is from Berlin, Germany, and is expected to arrive about the middle of July. The Pittsburg Machinery Company is doing a nice business. Geo. Dean and John Frain are in charge.

Capt. Dan Miller of the Miller-Durkee Coal Company at Scammon has during the past two years developed the finest coal stripping proposition to be seen in this field. It is well worth a trip to see and Capt. Dan is always on the job.

The W. W. Patterson Coal Company of Pittsburg are stripping coal with a model 250 Marion steam shovel at Alston, about 11 miles north of Pittsburg. J. C. Green is the engineer and A. Chancellor craneman.

Elmer Keeney is running a 150 ton Bucyrus with Fred Gebhardt cranesman, stripping coal for the C. H. Markham Coal Co.

Packard and McWilliams are stripping coal with a model 250 Marion steam shovel near Fuller. D. W. Humphrey, engineer and Chas. Lucia, cranesman.

The Clemens Coal Company of Pittsburg are stripping with a 150 ton Bucyrus at north Pittsburg. H. C. Colson is engineer and Roy Davis, cranesman.

The J. J. Stephenson Coal Company are stripping dead coal with a model 250 Marion shovel at north Pittsburg. O. E. Saner is engineer with Warren Little cranesman.

Henry Arnold is running a Vulcan steam shovel for the Haynes Coal Mining Co. stripping coal at Ardath. Sam Jones is cranesman.

The Pittsburg Paving Brick Company are operating two steam shovels, a 65 ton Vulcan in their shale pit on which Albert Malle is engineer and Earl Davis cranesman, and a model 250 Marion stripping coal, on which V. Pelton is engineer and J. C. Steel cranesman.

C. O. Dunbar as engineer and A. M. Herbeck cranesman are running Ellsworth-Klaner's model 250 Marion shovel at Midway stripping coal for the Pittsburg-Midway Coal Company.

A. C. Munch as engineer and Roll Emmitt cranesman are running Smith Scott & White's big 185 ton Bucyrus steam shovel No. 10. Edward St. John is on shovel No. 9 waiting for a new cranesman and Albert La Rue is running the No. 8 which is being used as a dragline machine at present. These shovels are all stripping coal about 2 miles south of Chicopee for the Central Coal & Coke Co.

The Junior Coal Company with Jas. Reed superintendent are operating a Marion steam shovel stripping coal north of Weir city. May Adams is engineer and Robert Wilson cranesman.

Bruce Weekley is engineer and Geo. Farley cranesman on one of the Ellsworth-Klaner model 270 Marion shovels. Wm. R. Wright is engineer and Burt Johnson cranesman on the other. These shovels are stripping coal 2 miles south of Chicopee for the Central Coal & Coke Co.

The Roy-Millner Coal Company are stripping coal near Weir City with a 150 ton Bucyrus shovel. E. J. Willey is engineer and John Lochead cranesman.

Chas. Davis is running a model 250 Marion shovel near Weir City for the Besse-Cockril Coal Company, stripping coal. C. B. Tichner is cranesman.

The Pittsburg-Scammon Coal Company's 150 ton Bucyrus steam shovel is working every day stripping coal about a mile south of Scammon with Mike Donovan as engineer and M. K. Flaherty cranesman.

Capt. Dan Miller is running his 95 ton Vulcan shovel every day stripping 20 feet of overburden with 30 feet of coal uncovered near Scammon. Wm. Bartino is engineer and Geo. Labard cranesman.

Chas. Arnold is engineer and Vernie Watkins cranesman on the Pratt-Durkee Coal Company's 95 ton Vulcan shovel, stripping coal at Skidmore, Kansas.

F. L. Crosby president and W. L. Craddock secretary of the Carrington-Calaway Coal Co. of Mexico, Mo. were recent guests at the Stilwell hotel, they came to look over coal stripping in this district and were very much impressed with the handling of earth with the monster steam shovels. Mr. Craddock said the article on coal stripping in the April issue of The Excavating Engineer was very interesting and that he had subscribed for the magazine. They expect to open up a large field of strip coal this summer and will put in a steam shovel plant.

Massachusetts

Blandford—George Phelps is at present master mechanic for John B. Carter Company at this point.

Boston—Plans for financing the Grand Trunk Ry. extension in New England (the Southern New England R. R.) have taken definite shape, and it is understood that the money will be forthcoming shortly for the completion of the line from Palmer, Mass., to Providence, R. I., work on which was suspended some months ago. It is stated that about $6,000,000 will be furnished by New England capitalists for this purpose.

Activities in railroad construction are at low water mark, with the Grand Trunk work abandoned, and the New Haven under fire, but the New Haven is four-tracking from Hyde Park to Providence, and from this fact it is probable that the electric line from Forest Hills to Providence, for which right-of-way was obtained two years ago, will be postponed.

Bourne—Edward Bourne is operating a 70-C Bucyrus shovel for E. W. Foley Construction Company on the Cape Cod Canal.

Bournedale—J. V. Donahue formerly superintendent of steam shovel construction at Panama, is at present superintendent with E. W. Foley at Bournedale, Massachusetts.

Minnesota

Notes from Duluth

Olson & Tully, contractors at Aitkin, Minn., were the successful bidders on a contract recently let by the Backus Lumber Company for grading 17 miles of railway from Deer River to Little Fork, Minnesota.

The North Dakota-Midland Continental R. R., has awarded a contract for 50 miles of grading work from Jamestown, N. D., north to T. J. Frederic & Barnard, railroad contractors with offices in the Globe Building, Minneapolis.

Construction work on the Berwind Coal Co's. dock is in full swing. Pile drivers are already on the property driving piles for the crib work and a sandsucker dredge is digging the channel.

The dredging will, it is estimated, take all summer. The sand will be deposited on the site and used for filling in the location.

The Great Lakes Dredging Co., which has the contract has one dipper dredge working on the place at this time, besides a hydraulic dredge. About 1,000,000 yards of dirt will be removed from the channel leading to the place.

A great deal of dock work will be done in West Duluth this season. The Zenith Dredge Co., is completing the dredging in the vicinity of the Island Creek Coal Dock. The company has about half a million yards to move. A hydraulic dredge is doing the work.

The contract for paving approximately twenty blocks at Hibbing at an estimated cost of about $150,000 has been awarded to the Butler-Coons Contracting Company of Hibbing.

Palmyra—R. H. & G. A. McWilliams, Steger Bldg., Chicago, Ill., has been awarded the contract for levees and ditches for the Marion County Drainage District. The work includes about 450,000 cubic yards of levees, filling 7,000 cubic yards, muck ditch and canals and ditches calling for 100,000 cubic yards of excavation.

Missouri

St. Louis Items
By A. J. Michel

Keating Bros. have twenty fine teams idle at present. Address them care Michel labor agency, St. Louis.

Jerry Wolf passes through here on his way to Memphis where he expects to take charge of a large team outfit on some levee work.

If he does not make connection he is open for a proposition. Jerry is an old time contractor and knows the grading business from the "stakes to the kitchen". His address is Mitchell, Ill.

P. H. Buck made us a pleasant call recently. Nothing new with him at present.

Lorimer & Gallagher have the contract on the Illinois Southern Traction Line from east approach of Free Bridge to Belleville. They have some light team work to let and also some heavy work along the Bluffs near Belleville. Address them 26th and Trendele Streets, East St. Louis, Ill.

W. Grimes has taken a slice of Lorimer's work on the east side.

J. D. Vogt of Belleville has twenty dandy teams busy on the new traction work. He says the dirt is flying fast and furious at his camp. Vogt is a hustler and expects to finish far ahead of the contract time.

Labor is about as scarce at this time as it ever was in the history of railroad building.

Some of the railroads in this vicinity are contemplating bringing negro and mexican labor from the south. The idea is to flood this section with southern workmen so that each road would benefit to some extent.

Wm. Pieper of 3432 Louisiana Ave. has five teams he would like to place on a steady day job for the summer. Write him direct if you can use them, St. Louis.

Gus Sprecht is in the market for a position as track foreman or book keeper for some large outfit. 2328 Virginia Ave will reach him, St. Louis.

The M. K. & T. R. R. Co. are expecting to build new shops at Parsons, Kans. for heavy car repair work. This will in no way effect the shops now at Sedalia. S. B. Fisher is chief engineer, St. Louis.

W. E. Tench & Co. are about finished on this end on the Wabash R. R. at Ivesdale, Ill. They have another piece of work at Tolono where they will be located in the very near future.

Lou McClelland reports things in fine shape at Bement, Ill. Mac has ten Missouri mules and a few horse teams busy at this place.

Carmichael Construction Co. have been awarded several new concrete bridge jobs at various points along the Wabash R. R. The Watkins-Pollock Boarding & Commissary Co. are operating the camps for Carmichael.

If you have work to let or have any kind of outfits idle let Michel know about it. He will be pleased to mention it in the next issue of The Excavating Engineer.

Montana

Babb—The bids for the construction of the St. Mary Canal, St. Mary Storage Unit, Milk River Project, which were opened on April 28th have been rejected because too high, and the work is to be done by the Reclamation Service, themselves.

Nevada

Ruth—A. O. Sisson, formerly of Eveleth, Minnesota, is now with the Nevada Consolidated Copper Company.

New Mexico

Tucumcari—The Empire Construction Co., of Omaha, Neb., is reported to have secured contract for the construction of a railroad from Tucumcari, N. M., to San Antonio, about 600 miles.

New York

West Hurley—Ned McCartney is operating a 70-C Bucyrus shovel for Winston and Company on the U. & D. R. R. here.

Seneca Falls—The Lehigh Valley R. R. has awarded the contract to the John F. Dolan Contracting Co., 50 Church St., New York, for the extension of its Seneca Falls branch, from Seneca Falls to Cayuga Junction.

Syracuse—The Delaware, Lackawanna & Western has plans under way for double tracking its line from Solvay to Jamestown, and it is probable the work will be undertaken this summer.

North Dakota

Fairmont—The Fairmont & Veblen R. R. has awarded the contract to Whittier & Brolander, for the construction of a 46 mile railway from Veblen, S. D. to Fairmont, N. D. The work will include the construction of three trestles, and about 500,000 cubic yards of grading. J. S. Thomas, Minneapolis, Minn. is chief engineer.

Panama

The zone of dredging operations at the Pacific end of the Canal will be extended to include the section between the two earth dikes, south of Miraflores Locks. It was originally planned to excavate the material remaining in this section by steam shovels, but as the dredges have nearly finished their work in the Pacific entrance, they will be available for use at this point. About 151,000 cubic yards of material between the two dikes were removed by the hydraulic plant, and 16,000 cubic yards by steam shovel, leaving about 1,400,000 cubic yards to be excavated by the dredges. A dynamite gang is now engaged in blasting

over this territory, and will conclude its operations early in May. The south dike acts as a barrier to the open water channel extending from the Pacific entrance. When the space between the dikes is ready to be filled with water, the operation will be accomplished by pumping, instead of allowing the water to flow in by demolishing the south dike. This precaution is taken, in oder that the north dike will not be subjected to a too sudden pressure.

Pennsylvania

Homer City—James Cowan is operating a 70 ton Bucyrus shovel for the Miller Construction Company. Mr. Cowan has been operating Bucyrus machines for the last fifteen years.

Marianna—The Chartiers Southern R. R. has awarded the contract for the construction of its proposed line to the Brocklehurst & Potter Co., Providence, R. I. The line will be about 19 miles in length and will extend from Emman, Penn., to Marianna, Penn.

Tennessee

Memphis—In the next 30 to 50 days, bids will be received for levee construction along the Mississippi River between Cairo and the White River, to the extent of about $800,000.00 worth of work, to be performed in several contracts running from 6 to 18 months.

It is possible that work of similar character, during the season of 1914 and thereafter for a number of years, will be let to the extent of several millions of dollars per year.

The work consists of levee construction along the customary lines, and, although heretofore performed by teams, it is highly desirable that machine work, as well as team work, should be encouraged by reason of the largely increased quantities likely to be involved, and the fact that the work will probably be let in continuous stretches of many miles. Heretofore animal labor has necessarily been used almost exclusively, by reason of the non-continuity of the work, involving excessive expense in moving machine equipment from place to place.

Texas

Sterling City—The Atchison, Topeka & Santa Fe is reported to have completed surveys for the construction of its proposed extension from Lamesa, in a southerly and easterly direction to Sterling City, Tex., a distance of about 100 miles.

Virginia

Roanoke—Jos. H. Sands Contracting Co., Roanoke, Va., has been awarded the contract for double tracking the line of the Atlantic Coast Line R. R. between Pleasant Hill, N. C., and Petersburg, Va., a distance of 60 miles.

Abingdon—Virginia, Carolina Ry. has received bids for an extension of 40 miles. The line will pass through Washington County, Va., and Ashe County, N. C., to Todd. N. C. P. W. Early, Abingdon, Va. is chief engineer.

Washington

Spokane—G. O. Foss & Co., Spokane, Wash. have secured a subcontract from Guthrie, McDougall & Co., on the Northern Pacific double tracking through the Cascade Mountains. The subcontract covers about three miles of line out of Lester and involves some heavy work.

Seattle—It is reported that the Chicago, Milwaukee & Puget Sound Ry. Co. (E. A. Reeder, chief engineer, Seattle) will at once expend $3,000,000 in constructing a line from Helsing Junction on its main line between Seattle and Aberdeen, southward to Raymond on Willapa Harbor.

REVIEW OF BOOKS and CATALOGS

We shall be glad to review in this column such books and catalogs as are sent to us. Books reviewed in these columns will be supplied by The Excavating Engineer Publishing Company at the prices named.

Modern Pumping and Hydraulic Machinery—by Edward Butler M. I. Mech E.—473 pages, 6"x9", 345 illustrations, cloth binding,—Price, $5.50.

This book is a practical handbook for engineers, designers and others engaged in the construction and application of pumping and hydraulic machinery. It covers a broad field of applications, from drainage, dredging and irrigation work to injectors, condensers and fire pumps. The construction and working as well as the relative advantage of various types are considered. It is a concise and thorough treatise of a large and growing subject—J. P. Lippincott Company, Philadelphia, Pennsylvania.

Independent Powder Company, Joplin, Missouri. Catalogue 5½" x 7½", 61 pages, describing different brands of powder manufactured by this company. A preface describes the modern method of manufacture.

Pumping Machinery—By Wm. M. Barr—Illustrated 483 pages—Cloth bound—Price $5.00.

A practical hand-book relating to the construction and management of steam and power pumping machines, with 287 engravings.

This book, now in its second edition, covers every essential detail of pump construction. It is a guide for the practical users rather than for the scientific construction of such machinery. J. P. Lippincott & Co., Philadelphia, Pa.

Audel's Answers on Practical Engineering for Engineers, Firemen and Mechanics.

Answers to questions on steam boilers, engines, pumps, injectors, lubricators, turbines, safety valves, gearing, belting, etc.—Price $1.00.

Theo. Audel and Co., 72 Fifth Avenue, New York.

Ingersoll-Rand Company, 1505 Peoples Gas Building, Chicago, Illinois—Brochure, 4" x 6", entitled "Good Roads", describing and illustrating in an artistic manner various types of drills, compressors and steam plants, designed for the road-builder and contractor.

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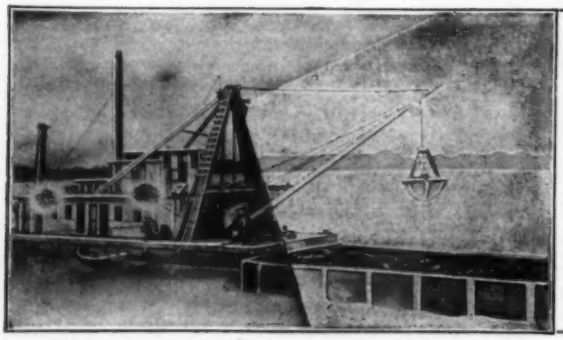

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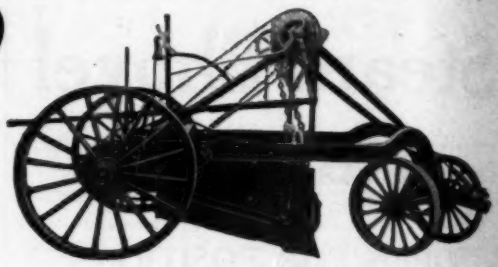

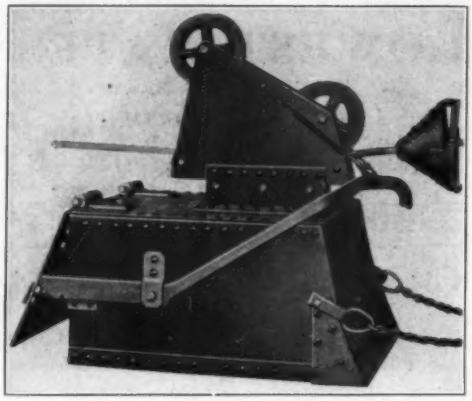

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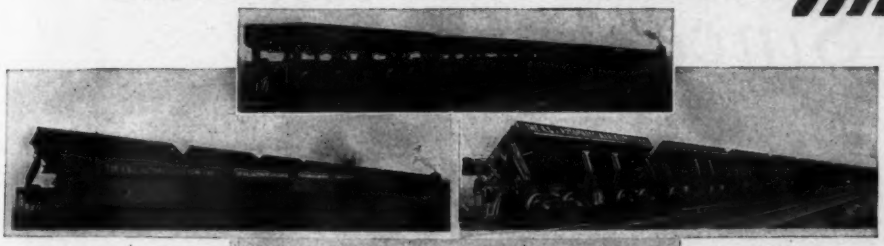

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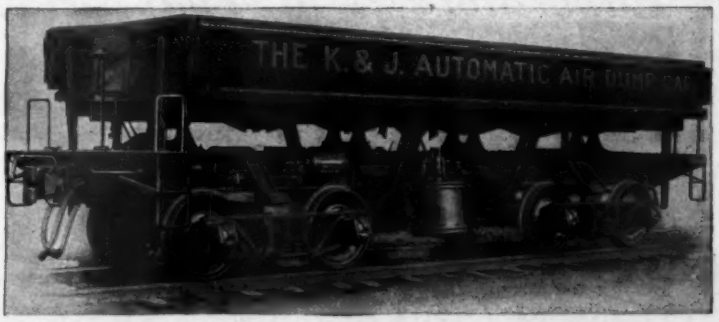

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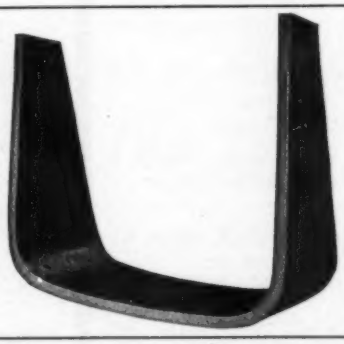

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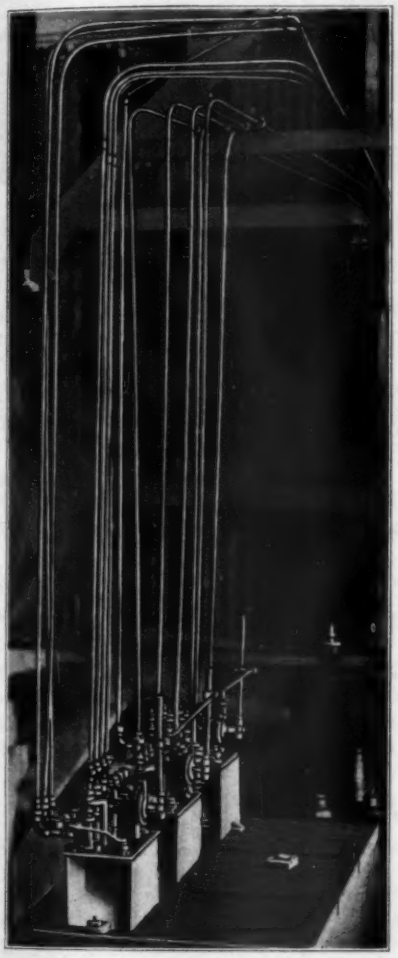

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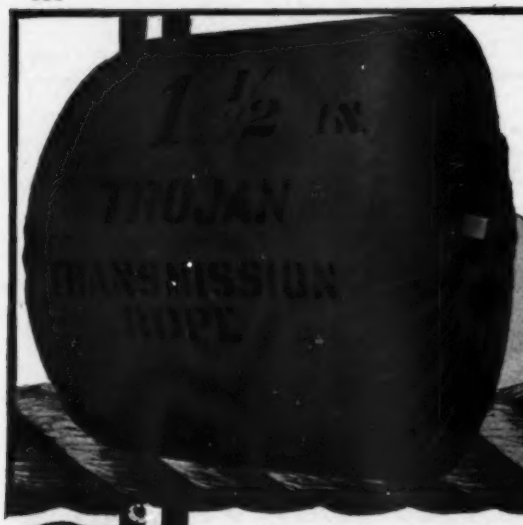

TROJAN TRANSMISSION ROPE is *Built*

¶ There's as much difference between using ordinary transmission rope and Trojan as there is between wearing a ready-made suit and one made to your measure. Trojan Transmission is planned in every detail for wear and strength. With all conditions and requirements in front of us we have taken them one by one and met them by constructional care.

¶ Tensile strain—crushing—torsion—friction—all of these features enter into transmission rope wear—they are all taken care of in the planning and manufacture of Trojan Transmission Rope.

¶ There is the straightaway strain on the rope from pulley to pulley—the wrench of the outer fibres farthest from the sheaves as the rope is carried around corners or curves—these things call for dependable tensile strength—Trojan strength.

¶ There's the crush of the fibres nearest the pulley at corners and curves—the extreme fineness and pliability of the fibres of Trojan Transmission Rope takes care of this.

¶ Then there's the twist of the rope in the running—torsion—we've taken care of that in the quality of the fibre and in the care in the making.

¶ Friction—not alone the rope against the pulley but the internal friction of fibre against fibre and of the strands against each other and the core—all this is reduced to a negligible minimum by our *internal* lubrication. That's why

TROJAN TRANSMISSION

—indoors, outdoors, in all kinds of weather and under all tests wears best—lasts longest—and gives the maximum of power efficiency every day it is in use. Made of the best selected Manilla hemp—only. Treated with our special preservative compound. Inspected for defects—tested for tensile strength—core treated with lubricant which works its way throughout the entire rope—every fibre. Requires *no* other lubrication during its whole life.

More About Trojan In Our Free Book

"Trojan Transmission" which treats untechnically of rope transmission and Trojan. Write us fully about your problems—for prices, information, anything that will help—we'll answer freely.

We Ship Without Delay—on Telegram if Necessary.

ST. LOUIS CORDAGE MILLS, Dept. EE, St. Louis, Mo.

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Jordan Spreader

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Pneumatic Control

Operated by One Man

Jordan Spreader Operated by Walsh-Hogan Construction Co., at Forbes, Minn.

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The Result of 28 Years of Specialization

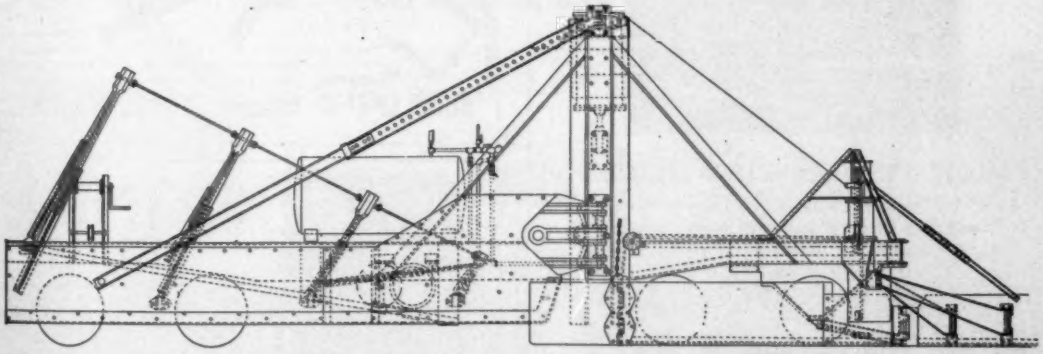
¶ Will spread as much material as 2500 laborers, at an expense of $30.00 to $35.00 a day.

¶ It spreads to 45 feet in width, cuts a grade to 24 inches below and to 17½ inches above top of rails.

¶ Built in 80,000 to 100,000 pounds capacities.

¶ Easily operated by one man. Adjusted by pneumatic control.

¶ Adapted for use as a snow plow, ballast plow, flanger, scraper, bank builder and spreader. Write for catalog.



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For Steam Shovel and Dredge Men

The coal that suits your peculiar requirements must be the best — clean — outdoor stocking quality — a long flame burner that does its work in the flues.

PYROLITE COAL

is that sort—used by the McWilliams—Canal Construction — and others of the biggest contractors in the country. Let us quote prices and freight on your jobs in the middle west.

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MODEL "K" FOR STEAM SHOVELS
has stood the test of more than five years. Not one has broken and the only repairs necessary have been a few "Grip Points"

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FOR CONCRETE REINFORCEMENT

We manufacture benders for all kinds of work, such as forming Rings, Hooks, Eyes, "U" Shapes, Angles, Pipe Bending, etc. Our No. 5 Bar Bender will handle 1¼" high carbon twisted, corrugated or other reinforcement bars, *cold*. Operated by one man. The most powerful tool of its kind. Used extensively by railroads and large contractors. Tell us your needs and we will send catalogue.

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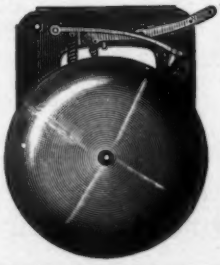

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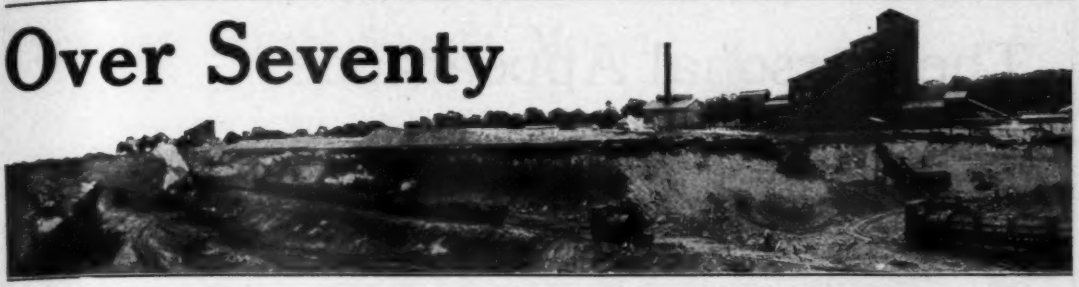

VULCAN Contractors' Locomotives

at work on the operation of the Central Penn'a Quarry Stripping & Construction Co. for the Lehigh Valley Coal Co., near Hazleton, Pa.

The photograph shows ten.

VULCAN Locomotives are built for service—hard service and lots of it. That's why they are found on practically every operation of importance in the country.

The best guarantee that VULCAN Locomotives "make good" is the fact that the contractors who try them always come back for more; and this number is ever increasing. Can't we add your name? Let us send you a catalog anyway.

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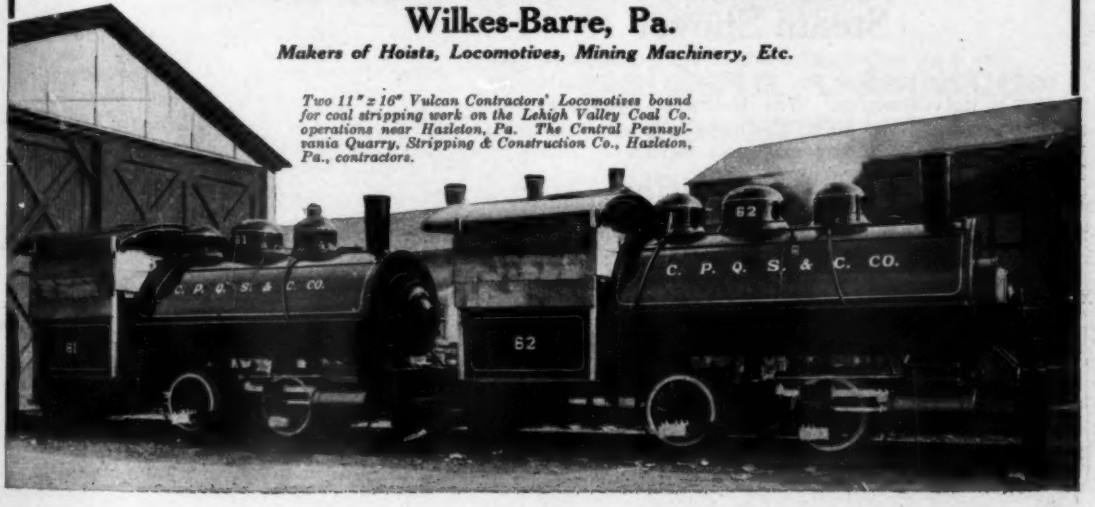
Wilkes-Barre, Pa.

Makers of Hoists, Locomotives, Mining Machinery, Etc.



Two 11" x 16" Vulcan Contractors' Locomotives bound for coal stripping work on the Lehigh Valley Coal Co. operations near Hazleton, Pa. The Central Pennsylvania Quarry, Stripping & Construction Co., Hazleton, Pa., contractors.

The Personal Appearance

of the representatives of every business concern is an important factor in securing an audience with the man who buys. The successful salesman knows this. He dresses with scrupulous care and taste and his best mannerism is in evidence when he makes his calls. He tries to please.

Every business concern knows this and yet many of them overlook the fact that the letterhead, pamphlet, booklet or full grown catalogue is as much a "personal representative" as the travelling salesman. Some of these concerns send out thousands of these "personal representatives" that are so badly "dressed" that the buyer throws them out into the cold world by way of the scrap basket. They were unattractive and the goods they represented is placed in the same catagory.

Our business is to furnish the "personal representative" that gets to the buyer and stays there.

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Do You Know the Profits in Washed Gravel?

Do you know that you can produce washed and screened gravel at a cost of 10 to 18 cents per yard? Do you know that it sells at the pit for 35 to 75 cents per yard?

An Opportunity for Your Steam Shovel

This is an important part of the equipment. The cost of the conveyors and screens for a reasonable output is not excessive. The business, therefore, offers strong rewards for good business judgment and initiative without requiring excessive capital.

Our Proposition

We will make a thorough study of your situation and design the plant to suit the capacity of your shovel and the demands of the market. Our record of 200 profit paying plants will insure you a successful plant.

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The "Labor Saver" Will Give You Live Pointers

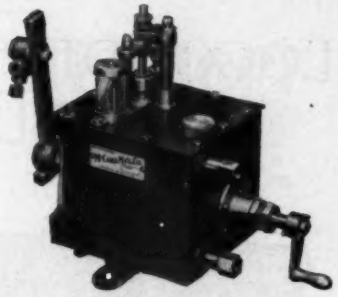
This monthly publication gives you live news of what others are doing in this field. If you are interested, we will place your name on the mailing list.

The plant of the Battjes Fuel & Building Material Co., of Grand Rapids, Michigan is described in Labor Saver No. 54. Gravel is loaded by the steam shovel directly to the portable field conveyor and delivered thence to the washing screens which separate it into four sizes. The material may be drawn directly to railway cars from the bins. The capacity of this plant is 500 yards daily of the highest grade gravel.

SPECIAL STEAM SHOVEL MODEL

The cut illustrates our Steam Shovel Lubricator. It has been made to meet the special needs of the steam shovel and dredge, and we call your attention to its distinctive features — not found on any other lubricator.

1 — Heating Chamber *3 — Reversible End Bearing*
2 — Drain Plug *4 — Drop Forged Operating Lever*
5 — Auxiliary Priming Device



"McCord" *FORCE FEED* Lubricators

have these special features in addition to such standard requisites as — Automatic Action; Positive Sight Feeds; Simple and Accurate Adjustment of Feeds; Durable Driving Mechanism; Accessibility of Pumps and Interior Mechanism Running in Oil.

A "McCord" Force Feed Lubricator will make your work easier, will save wear and tear on those valuable engines you're running and will reduce your oil bills one-fourth. Figure the saving—and the results to yourself.

Send for the special folder which explains all about them, then try one for a month at our expense. Remember you can return it "Collect" if not satisfactory, so you can't lose.

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Gentlemen:—Please send me your special folder "Y" and details of free trial offer of Lubricator.

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